

THEY'RE BACK! GLIDER AND 4-STROKE ENGINE COLUMNS



MODEL

Canada \$3.75



48120

MARCH 1988

\$2.95

# AIRPLANE

THE WORLD'S PREMIER R/C MODELING MAGAZINE

NEWS

JETS over TEXAS!



DRAW YOUR OWN PLANS

R/C Goes HOLLYWOOD

EXPANDED HELICOPTER COVERAGE



COVER YOUR ROTOR BLADES





# MODEL AIRPLANE NEWS



**ON THE COVER:** Ron Able's Byron F-15 Eagle ready to launch while Dan Santich's Coverite Peashooter banks underneath. A piece of the action at the 5th Annual SWFF has Chris Abate assisting Bob Violett with a SportShark. David Trost positions the X-Cell 60 helo for photos.

**ABOVE:** Joe Makovich's colorful O.S. 40 4-stroke-powered Great Planes Big Stik 20 makes a low pass for the camera.

## FEATURES

- 14** "Likewise"  
by Rich Uravitch.
- 27** Moving Time ...  
by Ray Stark.
- 44** Southwest Fan Fly  
by Rich Uravitch.
- 56** Coverite Peashooter  
by Dan Santich. A  
Field & Bench Review.
- 62** Miniature Aircraft  
Supply X-Cell 60  
Helicopter  
by David Trost. A  
Field & Bench Review.
- 65** United Model  
Products  
Super Rieti  
by John Lupperger.  
A Field & Bench  
Review
- 73** Using Heat-Shrink  
Blade Covering  
by Ron Farkas.

- 68** Great Planes  
Big Stik 20  
by Joe Makovich. A  
Field & Bench Review.

## CONSTRUCTION

- 37** Osprey  
by Joe Wagner.

## COLUMNS

- 12** Fifty Years Ago  
by Steve Pond.

- 18** Helicopter  
Challenge  
by Craig Hath.
- 20** Basics of  
Radio Control  
by Randy Randolph.
- 22** Quiet Flight  
by John Lupperger.
- 30** Small Steps  
by Randy Randolph.
- 41** Floating Around  
by John Sullivan.

- 48** Golden Age of R/C  
by Hal "Pappy" deBolt.
- 50** Four-Cycle Forum  
by Chris Abate.
- 54** Engine Review:  
Saito FA-45 MKII  
by Peter Chinn.
- 70** Giant Steps  
by Dick Phillips.

## DEPARTMENTS

- 6** Editorial  
by Rich Uravitch.
- 8** Airwaves
- 16** Hints & Kinks  
by Jim Newman.
- 84** Name the Plane
- 85** Club of the Month
- 104** Product News
- 115** Ad Index



# Editorial

by RICH URAVITCH

IT'S ALWAYS NICE to welcome back old friends. I tend to look at the columns in *MAN* as old friends. I knew them some time ago and enjoyed their company; they always had something to say which I didn't always agree with, but they communicated. Then, for whatever reason, they went away. I missed their words, the bits of information, what was going on with other friends. So did others. When they return we anticipate that return... so much to catch up on, so much time lost, so much going on, so many new things to talk about.

This month I'm happy to welcome back two old friends: the "Soaring" column and "Four-Stroke Forum." John Lupperger, an active West Coast modeler and noted sailplane designer, approached us with an idea of combining soaring with electric power in a fresh, new column called "Quiet Flight," the first installment of which appears in this issue. Our other returning friend is the "Four-Stroke Forum" dealing with all the 4-cycle engine issues that may be of interest to you. It also returns in this issue with the word processor and camera of Chris Abate, a frequent contributor to this publication. Chris was a key player in the establishment of the very popular 1.20 4-stroke pylon racing

event in the Midwest, and he knows more about the practical end of 4-stroke operation and maintenance than anyone around. The thinking here is, and the auto manufacturers prove it time and time again, if you want to see how machinery performs, how it holds together, what breaks and

how you fix it, go racing! Chris has been through all that with the 4-strokes and will be sharing it with us as well as responding to your specific questions.

• I enjoy reading all the club newsletters that we receive, but I'm not sure

that all of the club secretaries out there are aware of our monthly "Club of the Month" contest. Put us on the distribution list for your newsletter and your club will be eligible for selection as our Club of the Month. If selected, you'll receive two complimentary subscriptions. What could be easier?

• We have a great issue in the works for you next month... Small planes! two construction articles including the neatest little Laser you've ever seen; kit reviews; "ARF Analysis"—all with nothing larger than a .25 displacement engine! We'll also present some exciting color coverage of the 1987 Pacer Tech Scale Masters competition... see you then!!



"Yamato Saburo" Uravitch with his ill-fated JHH F-86 at the SWFF. Photo by Frankel.

## MODEL AIRPLANE NEWS

The world's premier R/C modeling magazine

**Group Publisher**  
LOUIS V. DeFRANCESCO, JR.

**Publisher**  
DR. LOUIS V. DeFRANCESCO

**Associate Publisher**  
YVONNE M. MICIK

**Editor-in-Chief**  
RICH URAVITCH

**Associate Editor**  
CHRIS CHIANELLI

**Managing Editor**  
RICK NACCA

**Copy Editor**  
LYNNE SEWELL

**Editorial Assistants**  
JACQUELYN NIZOLEK  
KATHERINE TOLLIVER

**Art Direction and Design**  
ALAN J. PALERMO

**Assistant Art Director**  
MARY LOU RAMOS

**Typographer**  
CHERYL CERES

**Art Assistant**  
MATT LONGLEY

**Advertising Director**  
FREDERICK J. MURPHY

**Advertising/Production Manager**  
CHRISTINA FURORE

### SUBSCRIPTION PRICES:

U.S. & Possessions (including APO & FPO): 1 year \$25.00; 2 years \$47.00; 3 years \$65.00. Outside U.S.: 1 year \$33.00; 2 years \$63.00; 3 years \$89.00. Payment must be in U.S. funds.

**MODEL AIRPLANE NEWS** is published monthly by Air Age, Inc., 632 Danbury Rd., Wilton, CT 06897. Connecticut Editorial and Business Offices, 632 Danbury Rd., Wilton, CT 06897, phone 203-834-2900. Y.P. Johnson, President; G.E. DeFrancesco, Vice President; L.V. DeFrancesco, Secretary; Y.M. Micik, Treasurer. Second Class Postage paid at Wilton, Connecticut, and additional Mailing Office. Copyright 1988 by Air Age, Inc. All rights reserved. ISSN No. 0026-7295.

**CONTRIBUTIONS:** To authors, photographers, and people featured in this magazine, all materials published in *Model Airplane News* become the exclusive property of Air Age, Inc., unless prior arrangement is made, in writing, with the Publisher. The publisher assumes no responsibility for unsolicited material. Only manuscripts and supporting material accompanied by a SASE will be returned.

**ADVERTISING:** Advertising rates available on request. Please send advertising materials, insertion orders, etc., to Advertising Dept., Air Age, Inc., 632 Danbury Rd., Wilton, CT 06897, phone 203-834-2900.

**CHANGE OF ADDRESS:** To make sure you don't miss any issues, send your new address to Subscription Dept., *Model Airplane News*, P.O. Box 428, Mount Morris, IL 61054, six weeks before you move. Please include the address label from a recent issue, or print the information exactly as shown on the label. The Post Office will not forward copies unless you provide the extra postage. Duplicate issues cannot be sent.

**POSTMASTER:** Please send Form 3579 to *Model Airplane News*, P.O. Box 428, Mount Morris, IL 61054.



**BOB VIOLETT MODELS**  
1373 Citrus Rd. • Winter Springs, FL 32708  
305-365-5869

## 8 MODEL AIRPLANE NEWS





# COVERITE PRESENTS NEW PRODUCTS FOR 1988... AT YOUR DEALER NOW!!!

## THE ONE AND ONLY GRAPHICS LETTERS AND NUMBERS IN 1/4" AND 1/2" SIZES

Graphics have been called "The Rolls Royce of decals" because they are the only ones that are made of 100% cast vinyl with the color imbedded in the vinyl. Mylar decals have the color in the adhesive, which leaks out when fuel gets to it.

The Graphics line is also thermal die cut. Each letter, number, star, stripe and trim sheet is cut precisely, without any raised edges, or unsightly plastic borders. Graphics are paper thin and since they are pressure sensitive, all you have



to do is peel'em off the sheet, and press'em in place. The adhesive system is remarkable - totally fuelproof, even

after repeated exposure.

Up til now, Graphics letters and numbers have come in 1", 2" and 3" sizes. Now there is a new sheet that contains **both** 1/4" and 1/2" numbers and letters - all on one sheet. Just the right size for boats, cars and of course planes.

## ALL GRAPHICS NOW COME IN 5 MATCHING COLORS

In addition, the entire Graphics lineup is now available in 5 colors instead of just 3: fire red, cub yellow, flag blue, black and white. These colors match our Black Baron Epoxy paint, our Black Baron Film, and our Permagloss fabric iron-on covering. Ask your dealer for Graphics - unmatched quality...and very reasonably priced.

## SORT-A-SCALE PLANES BUILD AND FLY AS EASY AS ANY TRAINER.

SORT-A-SCALE PLANES don't look like trainers. They look sorta like real airplanes. Some even look fast and



THE  
FOKKER

tricky to build. But underneath their racy good looks is the easiest of all models to put together: the basic box fuselage and the remarkably stable Haffke wing. Thousands of modelers have already built and flown the first SORT-A-SCALE kit: **The Black Baron Special.**



THE BLACK BARON  
"SPECIAL"

Now two new models have been added to the series: **The Peashooter** and **The Fokker**. With optional tricycle landing gear, all three kits are certified



THE PEASHOOTER

for first time builders. More experienced builders have the choice of using the tail dragger configuration.

Each kit comes with multi-color decals, distortion free plans, pre-formed landing gear, 20 page instruction booklet with isometric drawings, die cut or machined wood parts, and a

Black Baron pilot figure that waves at the crowd.

Specs are identical: 56" wingspan, 51 lbs., 560 sq. in. wing area, 4 channel radio, .40 2 cycle or .40-.46 4 cycle engine.

## 15 FOOT ROLLS OF BLACK BARON FILM ARE NOW STANDARD IN ALL COLORS

In only 2 years, more than 100,000 modelers have switched to Black Baron Film. Introduced first in the USA, then overseas, it's now the fastest growing covering in the world. Originally packed as a 6 foot roll, modelers can now purchase new 15 foot rolls. Both sizes come in 27" widths - 1" wider than the competition. 15 footers are ideal for gliders with large wings and of course for the mammoth scale projects where a 6 foot length would be too small.

## INTRODUCING TRANSPARENT COLORS LIKE YOU'VE NEVER SEEN BEFORE!

Anybody who has ever used transparent yellow film knows all about its yuukkky greenish tone. Using a completely new compound, we have been able to produce a transparent yellow Black Baron Film that is pure, unmitigated yellow. The same is true with transparent blue and red. Each of these 3 new colors has a vibrance never seen before in any transparent iron-on film. Added to the recently introduced honest-to-goodness metalflakes (red, blue and silver), The Black Baron Film line now comprises 15 colors in all. 8 of them are matched by our Black Baron Epoxy paint line, and 5 by our Graphics line.

# COVERITE

420 BABYLON ROAD, HORSHAM, PENNSYLVANIA 19044

BLACK BARON FILM • 15 FOOT LONG



## MILLING MACHINE #1

### START YOUR OWN MACHINE SHOP

130# ship. wt.  
Accuracy .0005

Table size 3 5/8" x 15"  
3/4 h.p. variable speed  
100 to 3600 r.p.m.  
R-8 spindle

List Price \$985.00  
Freight \$86.00

Sale Price  
**\$699.00**



## TABLE LATHE 4" X 10" #2

83# U.P.S. 2 CARTONS



3/4 h.p. variable speed 110 volt  
3" 3 jaw chuck - 4 way tool post  
Cuts threads 12-112 T.P.I.  
Cast iron hardened ground bed  
7" swing over bed - 10" between center

**\$699.00**

List Price \$945  
Freight \$36.00

## PRECISION DRILL PRESS #3

A must for precision drilling  
Great for hobbyist

Sale Price  
**\$89.00**

List Price \$119.00 Freight \$4.00



## MULTI-GRINDER KIT #4

31 pcs. **\$89.50**

List Price \$119.00

Mounted stones, sanding disks, arbors, sanding bands, dressing stick, grinding wheel, polishing wheel, 36" flexible shaft.



Variable speed 6000 to 10000 R.P.M.

Freight \$4.00

## MACHINERY HAND BOOK #5



Tells how to operate lathes, mills, and all formulas for machine shops

**\$48.00**

Freight \$3.00

## 6" DIGITAL CALIPER #6

Accuracy .001  
reads in inch or metric



Sale Price  
**\$139.50**

Stainless steel, satin chrome, large easy to read display. Battery operated

Freight \$3.00

## C & R INDUSTRIAL TOOL & SUPPLY

5550 CERRITOS AVE., UNIT F, CYPRESS, CA 90630

**CALL 714-995-8665**

30 Day Money Back Guarantee  
Send \$2.00 for Hobby Catalog

Name \_\_\_\_\_  
Street \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Item \_\_\_\_\_ Quantity \_\_\_\_\_  
Charge to: ☐ Mastercard ☐ Visa Exp Date \_\_\_\_\_  
Send Check or Money Order

# Airwaves

(Continued from page 8)

the P-47 Alumni Association.

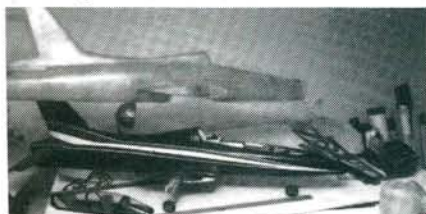
ROBERT N. DIXON, JR.  
Waverly, NY

Mr. Dixon, glad you enjoyed the article. A number of readers have requested the addresses of the two organizations mentioned, so here they are: P-47 Thunderbolt Pilots Assoc., Ltd., c/o Wings Club Inc., 52 Vanderbilt Area, New York, NY 10017; P-47 Alumni Assoc., c/o Cradle of Aviation Museum, Garden City, NY 11530

RAU

## Frecce Tricolori Fan

I'm a recent subscriber and I've just finished reading one of your back issues from January, 1987. I enjoyed your coverage of the OSHKOSH '86.



I'm interested in the Aermacchi MB-339As Italian Air Force Aerial Jets. If you can give me information on any kits, plans or models available I'd appreciate it. Again, a great write-up!

PETER S. ULI,

Peter, I know that many of you enjoy full-scale as much as I do; that's why we continually include small doses of it. If you liked last year's coverage, you've hopefully found this year's coverage equally enjoyable (February '88 issue). We are tracking down an MB-339 semi-kit, which David Jones told us is presently flying in Italy. Stay tuned to "Jet Blast."

RAU

## Military Aid?

A Design Contest; what a great idea! Great new designs! Could you do me a favor? I'm stationed in Holland with the Air Force and I haven't yet been able to find a club or a place to fly in the area. I'm between the towns of Utrecht and Amersfort. I'm going to be here for four years, and don't want to give up a great hobby. A stranded flyer.

TOM KLEINWACHTER

PSC1 Box 1813, A.P.O. N.Y. 09292

OK fellow flyers, here's the man's name and address. If you're in his area, why not get in touch? Having some buddies to fly with is so much more fun than flying alone.

RAU

# Seamaster 40

Designed by Ken Willard

Flies off of both land and water! Crisply die-cut balsa and lite ply parts, complete hardware, easy assembly, sensible engineering, clear plans, and photo illustrated assembly manual.

50K229 Seamaster 40.....

**\$99.95**



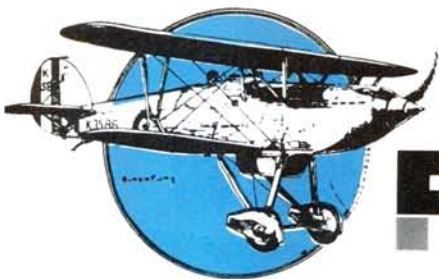
Span: 59 1/2"  
Area: 725 sq.in.  
Radio: Four Channels  
Engine: 40-45 two cycle  
60 four cycle



ARE YOU LEGAL?  
Our new frequency tags will keep you in A.M.A. Specs!  
**\$2.50**

Complete Catalog \$2.00. If ordered direct add \$2.00 Handling  
116 W. 19th St., P.O. Box 511E7, Higginsville MO  
64037 or call (816) 584-7121





# Fifty Years Ago...

by STEVE POND



**R**ebuilding the British Air Force was the title of a feature article by E.J. Bulban in the March, 1938 issue of *Model Airplane News*. Mr. Bulban had taken an in-depth look at the British Air Force and reported on some of the latest winged ones the Brits had to offer.

New to the Royal Air Force was the Bristol Blenheim Bomber. The Air Ministry discovered the Blenheim Bomber when a Lord Rothermere quietly submitted his own transport, built to his specifications, for its certificate of airworthiness. Some of the passing pilots and officials thought that the Blenheim was structurally unsound, but most thought that the new Bristol craft was worth a second look. During speed trials the Blenheim Bomber reached speeds of 270mph with only two 500hp engines!

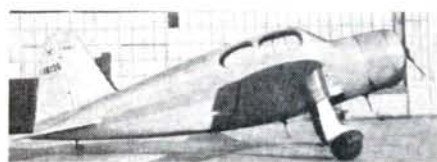
By the time the trials were over, Lord Rothermere's plane had been approved,

but he wasn't going home with it! The bomber became the property of the British Air Ministry for testing as a military plane. After the Air Force had finished adapting it to their needs, the Blenheim had a pair of Bristol Mercury engines rated at better than 800hp and was capable of flying faster than 330mph. The Blenheim proved to be a real boost to the British Air Force which had been suffering a seemingly hopeless succession of inferior aircraft.

With this new-found inspiration, the British produced quite a few new models to bring their fleet up-to-date. New models included the 300mph Fairey Battle, the torpedo-carrying Fairey Swordfish Navy recon plane, the Bristol 130 transport, the Avro Anson, the awesome Empire Flying Boat and, two of the most famous British fighters of the era, the Supermarine Spitfire and the Hawker Hurricane.

Elsewhere, military aircraft production was important, but the emphasis in the U.S. was on private and commercial aircraft. The commercial airlines had taken a fair share of the cross-country business away from the railways, but they had much to contend with in their attempts to make flying the Atlantic Ocean as safe and economical as sailing it. The trend seemed to lean more towards flying boats, and competition was fierce. American Airways and the American Export Company were dueling it out for airmail contracts, commercial freight and, of course, passenger transportation.

The popularity of airplane modeling grew at a steady pace with rubber-powered craft and gas-powered models. An article by Manley Mills went as far as suggesting that modelers attach floats to



*This rather odd-looking PJC-1 was powered with a 145hp Warner engine.*

their gas-powered models. Float flying is fun, but in those days it probably necessitated a lot of swimming! Another article, written by Robert C. Hare and titled: "How to Build the Transition Model," features a rubber-powered plane that could be instrumental in teaching the would-be gas enthusiast the ropes of gas building without incurring the potentially high costs. There were also the usual gas columns in *Model Airplane News*, such as "Designing Your Gas Model" and "Gas Lines." Although gas modeling seemed to be on a never-ending ascent, there was a dark cloud cresting the horizon.

Most worthwhile events, activities and developments have initially met resistance from one group or another. Such was the case with the then revolutionary idea of gas-powered model airplanes. Gas-powered flying had already been banned in two states, and the question of a ban had arisen in a number of other states. "Gas Lines," a column that served to report the happenings of the International Gas Model Aeronautic Association, had just encouraged four of the largest model airplane associations to join together in lobbying against the ban on gas models. The other three organizations were the Academy of Model Aeronautics, the Soaring Society of America, and the National Intercollegiate Flying Club.

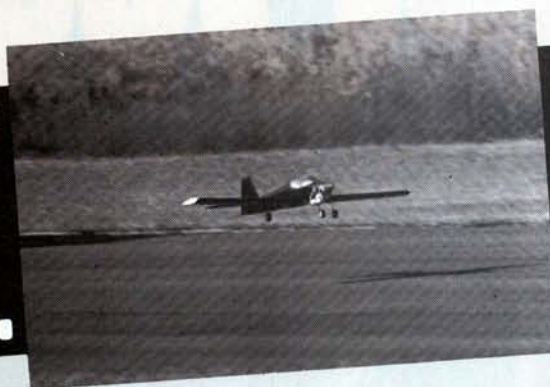
Judging from the content of this issue of *Model Airplane News*, it's obvious that the gas models had won, despite the eccentric "safety-minded" lobbying against gas-powered flight. We owe a great deal to gas-powered model flight; it served as a valuable alternative to expensive, full-scale experimentation and, during a time of such incredible growth, we probably owe many of our great flight engineers to model airplane flying. To all the aforementioned organizations that made model airplane flying what it is today: Salute!



*The Bristol Blenheim Bomber was just the kick in the pants the British aircraft manufacturers needed to update the Royal Air Force.*



## ARFs in the Movies



# "LIKEWISE"

by RICH URAVITCH



Left: The Zirolis boys fire up one of the Talons used in the sequence.

Below: This Talon survived the explosion with little damage. Obviously, a bigger charge was in order!



The Purveyors of Destruction: Ura-vitch, Zirolis Sr. and Jr. The airplanes knew not the fate that was about to befall them!



**L**OOK, RICH BABY, I've got this absolutely incredibly awesome idea for a film! There's these five well-to-do school buddies whose teacher is blinded in a mugging attempt. The operation to restore the sight is a big-ticket item, see? So these dudes decide to raise the geetas, get it?

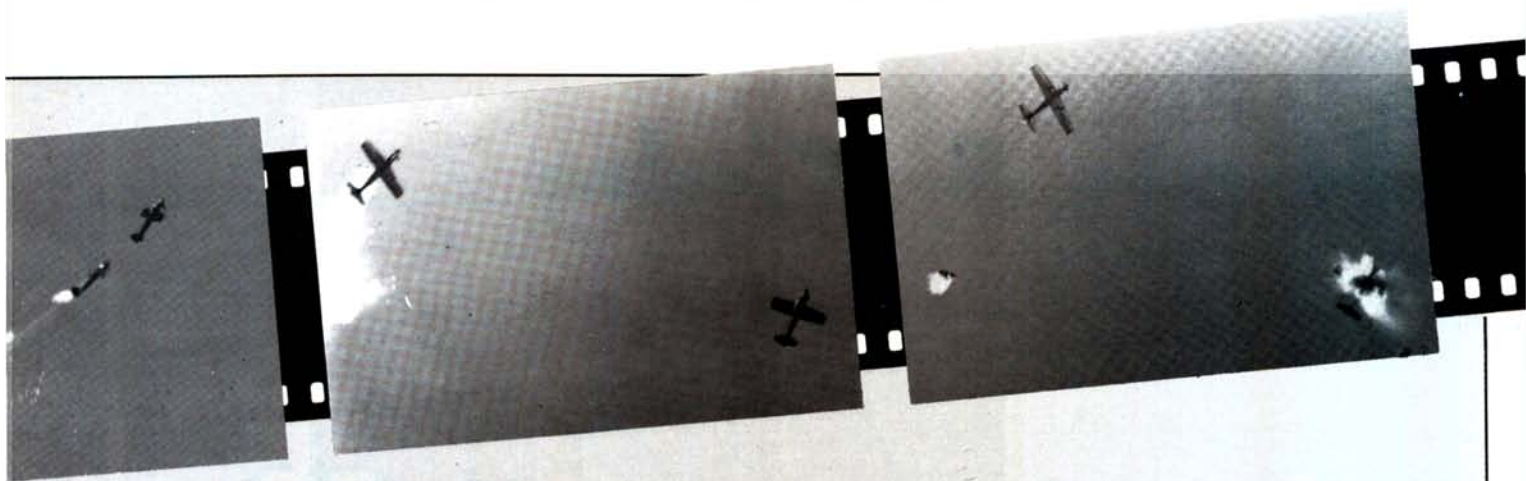
Since they're government/military brats living in the D.C. area, they figure that selling bogus military secrets could fill the till quickly. They visit a toy store, grab a plastic kit of a stealth airplane and enlarge the drawings which they offer to the Rooskies for 25 large, but for only half the drawings! Now the Feds chase the Rooskies, who are chasing the kids, who are chasing more secrets to sell. Ransom drops by radio-control helicopters, chase scenes by radio-control airplanes, explosion, destruction, annihilation, and a happy ending! Nice family box office, right? So, Rich, sweetheart, give it some thought, call my service, we'll do lunch... click!

That's not EXACTLY how the phone call went, but it is the story line behind an upcoming film with the pencilled-in title of "LIKEWISE" scheduled for release shortly after you read this. The actual phone call was from my buddy Nick "Giant Scale" Zirolis who was inviting me to help him and Nick Jr. out with the R/C portion of this film. I thought it

would be fun to be part of it, both participating and being able to tell you about it, so I accepted.

Shooting day arrived, and Nick had told me to be at our flying site (South Manor Flyers, N.Y.) early, so I was... solo!





*Pyrotechnics expert Matt Vogel arms one of the Indy Talons.*

The Zirol gang arrived later, along with some of our club members like Larry and Elaine Davidson, Don Conrads and the Zirol fan club. Still no movie crew! Now, one thing we

feel for what David wanted in position, speed and altitude. Since Nick and Nick Jr. fly formation together frequently, they took the Talons. Guess who got the Eagle? The ONLY Eagle! The sole Eagle for miles! You betcha, yours truly! Know what I'm talkin' about, Vern ole buddy? Well, the sinister-looking Talons, resplendent in their non-stock black and silver finishes, were airborne and orbiting. Throwing caution to the wind, with little regard for the fact that I'd NEVER flown this airplane before, I advanced the throttle and proceeded to ground loop my machine at least three times before

film veterans recognize is the pecking order of the cast and crew. At the very top is the star (who for this shoot was elsewhere); next is the crew in descending order of importance and, some distance below that, US!! Nick Jr. volunteered for the "Best Boy" job, before he knew what it entailed! Another thing you learn about the business is that film crews take lots of breaks, most of them centered on "sending out for food." This is OK until you understand that our field is a two-day pack-animal trip from the nearest convenience store. So the crew dispatched one of their own to cover the distance.

After a briefing from David Kappes, co-producer and second unit director, and Ooty Moorehead, production manager, on what we were expected to do, cameras were positioned to capture the action from two different angles: one from our flying vantage point, and the other at the end of the runway.

The airplanes selected as "actors" were the Talon 40 and Eagle, both ARFs from Indy R/C\*. We brought eight, yup eight, Talons plus just one Eagle biplane for this spectacle. All eight Talons were powered by Como .40s, while the Eagle got its go from a Como .90. Since the scene called for two Talons to chase the Eagle, collide and explode, the need for the abundance of Talons should be clear!

We decided to fly a few unarmed practice flights to get a



*Above: The aftermath. Ooty Moorehead joins the mercenaries. Left: David Kappes observes his camera crew shown discussing who gets the last meatball.*



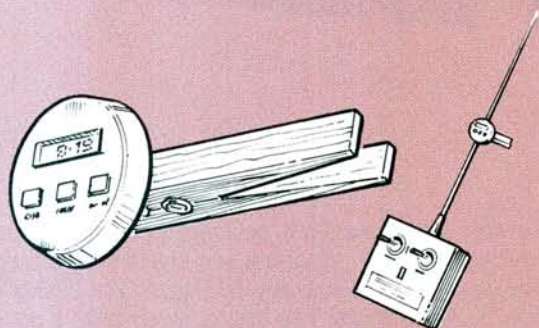
smartening up and moving it to the grass alongside our blacktop runway. This time, correcting with rudder, the multi-colored bird was airborne and climbing at a speed approaching its namesake! Certainly not underpowered! I had to throttle back to let the Z-Boys keep up and in position. A few laps to get the track and we landed for refueling and, in the case of the Talons, arming and BOCCIA DE MORTE!!

*(Continued on page 52)*



# Hints & Kinks

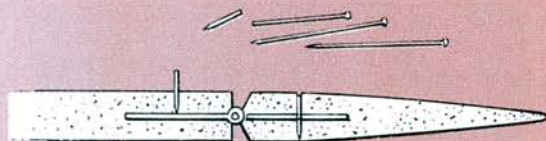
by JIM NEWMAN



## VISIBLE COUNT-DOWN TIMER

This modeler uses a ten-dollar timer from Radio Shack and, by gluing it to a clothes pin, he can position it on his antenna at eye level. It can be removed and safely pocketed when the transmitter is unattended.

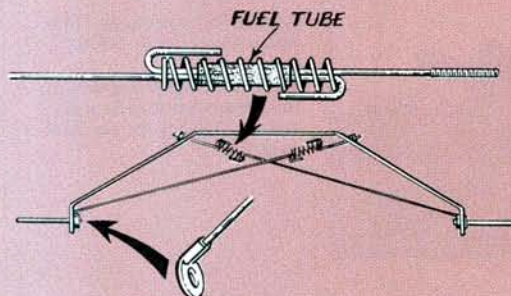
Darrill Sandberg, San Francisco, CA



## PINNING HINGES

It's usual to use toothpicks to pin hinges into a model structure, but this modeler finds it more convenient to use common pins—four to each hinge. By cutting each pin slightly shorter than the thickness of the trailing edge or control surface, each pin can be pushed into its final resting place with a small punch made from a piece of wire. A tiny drop of cyanoacrylate locks the pins in place. Your columnist has found that he can actually insert the pins after MonoKoting, the puncture holes made by the pins being very difficult to detect.

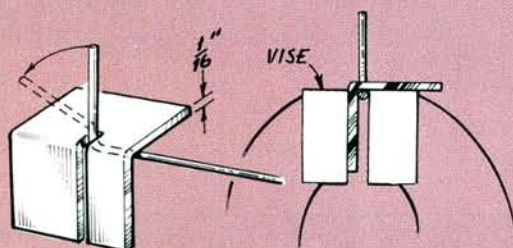
Cees Flink, Reitsum, Holland



## LANDING GEAR BRACING

If your sheet metal landing gear spreads on your large model, this simple remedy will help. A piece of fuel tube is used to stop the spring rattling around and perhaps generating RF noise. Instead of a 4-40 threaded rod, a heavy gauge spoke may be used instead. Compression springs are readily available at hardware stores and most NAPA auto parts outlets. This works on wire landing gears, too.

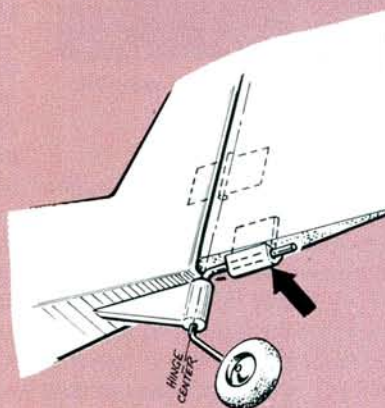
Ken Burton, Fairhope, AL



## EASY Z-BENDER

By cutting a slot that's a snug fit on the wire, this little sheet-steel tool will bend neat Zs. Make the 90-degree bend in the wire first, then insert the wire and clamp the whole thing in a vise before tapping down the wire for the final bend. Note how the slot goes 1/8 inch past the bend line in the plate.

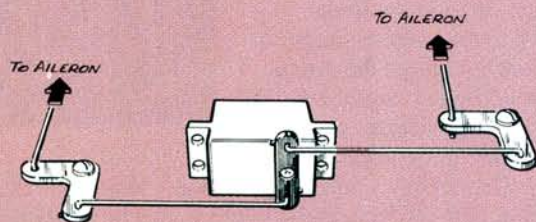
Michael Garze, Edison, NJ



## RUDDER/TAIWHEEL CONNECTION

Glue a regular strip of aileron-horn torque-rod bearing into the bottom of the rudder, then slide this over your tailwheel wire as shown. This eliminates the need to glue the wire into the rudder and, by using a long, removable hinge wire in the rudder hinges, the rudder may be removed for repair, etc.

Robert Johnson, Florence, SC



## AILERON ROD HOOK-UP

Instead of using commercial accessories at the center of his aileron pushrod (the type designed to allow connection to one side of the servo arm), this modeler merely attaches the rods to opposite sides of the servo arm and then installs the aileron bellcranks as shown.

John Clark, Shelbyville, TN



# Helicopter Challenge

by CRAIG HATH

*This article continues the discussion we started in the January issue.*

**T**HE FIRST ADJUSTMENTS will be for the correction of the constant left turn which is present for both examples given. For the heavy, underpowered machine we refer to the left turn which the helicopter settles into.

Begin by increasing the UP gain knob by about 20 per cent, and lift the helicopter into a gentle ascent. Remember to make the lift-offs gentle at first, and always try to make the ascents as similar as possible for best results. If the nose still turns to the left, keep increasing the UP gain until it holds straight into the wind. With the heavy helicopter, the nose will go to the left at first, and then settle into a straight climb. If you're fairly new to helicopter flying be warned that the tendency to turn left can only be observed within two feet

proper results.

**Advanced set-up:** Let's go back to our heavy or underpowered example. Don't take offense at this terminology. Some power-to-weight combinations are just easier to work around, and this is no reflection on the quality of your helicopter. As we lift off in the heavy machine, the nose will turn sharply at first and then, with the adjustment completed for the UP gain, will settle to a straightaway climb. At this point, we'll begin increasing the acceleration mix a little at a time until the helicopter lifts straight off the ground with gentle application of the throttle.

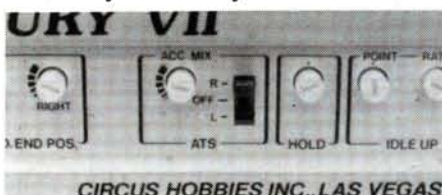
The acceleration mix gives a momentary application of additional pitch as you begin to add throttle. This additional pitch is very handy for overcoming several problems of flight, like the one just covered. In addition to this you may use the acceleration mix to compensate for the sudden increase in torque when popping the helicopter into the air hot-dog style, or use your imagination to compensate for any rapid addition of throttle/collective. Generally, this will cover the normal set-up for most machines. Check with the manual for your radio system if you have problems with your application, or if your system works differently from the system used here.



ATS up and down mix gain knobs from Century VII radio is typical for most radios on the market for helicopters.

of the ground. As the helicopter takes off, watch until it's one or two feet off the ground and then bring it down. If the nose begins to turn to the right, decrease the UP gain until the nose holds steady. Next we'll adjust the DOWN gain.

Once the UP gain is set so that the nose stays straight ahead in the ascents, we'll want to reverse the procedure for the descents. Climb the helicopter to a comfortable altitude for you, and decrease the throttle gently to idle, if possible, or at least to a low throttle setting for a normal descent to landing. Notice the direction the nose follows. If the nose turns to the left, increase the DOWN gain knob a little at a time until the helicopter drops with the nose straight ahead. It's important to get these settings fairly close, as they will be the basis for the advanced setup which follows. Repeat the trials as many times as you need to until you have the



This is a look at both the ATS acceleration mix and on/off directional switches. Be sure to set the mix to full counterclockwise before attempting any adjustment of the system, as this adjustment comes last.

## Special problems and special systems:

Once the ATS system has been adjusted, there may be some undesirable side effects, like the tendency for the nose to crab to the right in forward flight. Further, when the ATS is set for one flight style, it has to be changed manually when a different style is required. Some of the more advanced radio systems on the market have built solutions to these problems into the sets. The JR PCM 9

helicopter system is a perfect example. The transmitter incorporates a switch on the upper front panel for turning the ATS system on or off in flight. This feature allows you to deactivate the ATS whenever you want to change to forward flight for aerobatics or whatever. Be sure to turn the system back on before you begin the approach back to hover.

Another special feature of this system is a completely separate set of UP and DOWN gain pots for the Idle UP II system. This enables you to set Idle UP II for a completely different pitch curve along with its own matching ATS system. This system might be useful for autorotations, or for precision hover work.

Some of the ATS systems on the market handle the adjustment of the acceleration mix with two trimmer pots. One of the pots adjusts the length of time the "overshoot" lasts, and the other pot governs the amount of pitch added during the "overshoot." I think that both the Futaba PCM 8 and the JR PCM 9 handle the acceleration mix this way. This system allows for very fine tuning of the ATS, if you take the time to work with it. Another point to check would be the point in the movement of your throttle stick where the system begins to take effect. On some systems the UP gain comes in from half stick to full high, and the DOWN gain comes in from half stick to full low. If this is the case, you'll want to make all of your adjustments from hover to climb, and from hover to landing (hover at altitude).

One final note. Remember that all of the adjustments to the ATS system need to be made with the gyrosensor turned off. Inaccurate readings are probable if the gyro is left on. Also, after the ATS is set you may want to take a soft lead pencil and mark all of the positions off the trimmer pots and knobs. The system can then be returned to its correct setting in the event that the adjustments are inadvertently changed. This will cover the setting up of the anti-torque system.

Next month I'll discuss proper use, installation and adjustment of gyros. There are several brands on the market right now, and I hope I'll be able to cover most of them.



# PLANS

## Basics of Radio Control

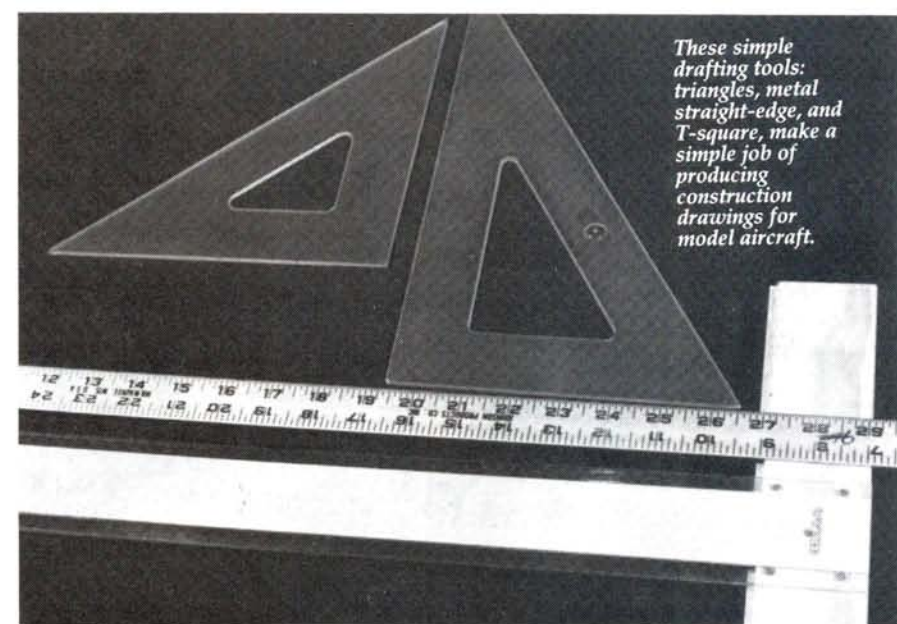
by RANDY RANDOLPH

**T**HE PLANS SUPPLIED with most R/C airplane kits are masterpieces of draftsmanship and art. They are drawn to assist the builder in a step-by-step assembly sequence so that nothing is left out. Instruction manuals clarify any areas that might cause confusion in the assembly process. In short, kit manufacturers go to great lengths and expense to help the buyers of their products achieve finished models that all can be proud of. However, it's really not necessary to have extensive plans to build a model airplane.

Naturally, the construction of model airplanes differs from full-scale construction in many ways, not the least of which is in the use of plans. In full-scale aircraft manufacturing, plans are used to produce jigs in which the aircraft is assembled; for model aircraft, the plans *are* the jigs. Because of this, the most important thing about model plans is the relationship of the various sub-assemblies to one another, so accuracy of the drawings is paramount.

With this thought in mind it's apparent that all the artwork and decoration on our plans aren't really necessary. Accurate construction comes from accurate drawings, and accurate drawings are made with a few very simple and inexpensive tools that anyone can acquire and learn to use properly. Other than a pencil and a drawing board, there are only three things necessary for true and accurate drawing: a T-square, a metal yardstick and a set of triangles.

The plans for a constant-chord wing show vertical and horizontal lines at right angles to each other. The horizontal lines



*These simple drafting tools: triangles, metal straight-edge, and T-square, make a simple job of producing construction drawings for model aircraft.*

are the spars, and the leading and trailing edges. The ribs are drawn in with vertical lines.

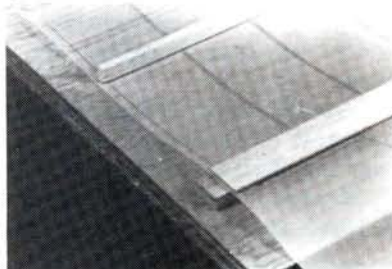
To draw a plan for this simple wing, place the short side of the T-square along the right edge of the drawing board so that it slides up and down along the edge and is in full contact with it at all times. The blade of the T-square will be the base horizontal reference for all drawing. The vertical lines are drawn using one of the triangles.

The two triangles have different angle arrangements. Both have one, 90-degree angle (right angle), while one has two, 45-degree angles, and the other has a 60- and a 30-degree configuration. These angles can be combined to form a number of different angles, but to draw our wing only the 60- and 30-degree angles will be used.

Just a few lines are necessary to provide the jig on which to build the wing. Attach a piece of paper, which is large enough for the wing panel, to the drawing board with masking or cellophane tape so that it won't move around. Position the T-square firmly against the edge of the drawing board and draw a straight line across the paper, holding your pencil against the blade of the T-square at a constant angle to the paper while drawing. Measure, and then make two dots along this line that are the same distance apart as the span of the wing panel. Hold the 60-30 triangle firmly against the blade of the T-square and make a vertical line at each of these dots that's the same length, or slightly longer, than the chord of the wing. Hold the pencil in the same way as when drawing along the blade of the T-square.



On the rib, measure the distance from the trailing edge to both sides of the main spar notch, and then transfer these measurements to the two vertical lines just drawn. Slide the blade of the T-square up to these marks, keeping the guide firmly against the side of the drawing board, and draw in the spar location. Measure, and then draw the leading edge in the same way.



Top: A basic, pencil-drawn plan done accurately is all that's necessary to produce wing structures.

Bottom: In model construction, the plan is often the "jig."

Move the T-square below the trailing edge marks and use the 60-30 triangle to draw the rib locations, properly spaced, between the leading and trailing edges. The plan is now ready to be used as a building jig. As a general rule, the rib spacing on R/C airplanes will vary with the span of the wing. Two-inch spacing is common with spans of up to 50 inches. On spans of from 4 to 6 feet, 2½ inches is normally used. This, of course, is for conventional planform wings with aspect ratios of 6-to-1.

Drawing an accurate plan is easy when it's for your own use. If there's sufficient reader interest, the design of simple aircraft will be discussed in later columns.

## FLASH! — FOX 45's AGAIN AVAILABLE

### NOW FEATURING:

- 1/4" CRANKPIN
- 7/32 TUBULAR WRIST PIN
- NEW STURDIER ROD
- NEW ALUM PISTON
- NEW WRIST PIN RETAINER
- NEW MUFFLER WITH TILT UP OR TILT DOWN CHOICE

PLUS AN APPEARANCE DRESS-UP



#24600  
**119.95**  
Including Muffler  
& Spinner

*We seldom blow our own horn — But allow us this one time.*

*Fox has been continuously manufacturing model motors in the U.S. for over 39 years under the same ownership and management. No other manufacturer can make this statement*

*Fox was the first to produce one piece die cast crankcases with cast in by-pass (1950).*

*Fox was the first to introduce nitro-methane to the model airplane trade (1947).*

*Fox was the first to use Rhodium as a catalytic booster to glow plug wire.*

*Throughout the years Fox has been the world's leading innovator in the model airplane motor field. Fly Fox and be one jump ahead.*

*Very few motors enjoy the owner loyalty the Fox 45BB does. It could be because it is so energetic. It could be because of its long life. It could be because it's backed by America's best service. However, we suspect the main reason is its completely predictable-user friendly nature. Fox 45 users are our best salesmen. Ask the man who flies one.*

**Exclusive Fox 45 Features Not Yet Available On Any Other Make Engine:**

- \* Choice of tilt up or tilt down muffler.
- \* Flange mounted carburetor for minimum case distortion.
- \* Trouble free rollpin wrist pin lock system.

**Buy Fox 45 — The choice of thinking modelers.**



**Manufacturing Company**  
5305 Towson Avenue  
Fort Smith, AR 72901

## For CANADIANS Only

## ALBERTA'S LITTLEST AIRPORT

A complete inventory of Byron Originals Products

## AT FACTORY DIRECT PRICES

Western Canada's largest supplier of  
Radio Controlled Aircraft

**Call 403-373-3953 Today**

Box 6, Bawlf, Alberta T0B 0J0

VISA Welcome

Send \$5.00 For Complete Catalog.

## HIGH QUALITY FULL KITS

• 8 FOOT BEAVER

• TURBO BEAVER

• OTTER

• 7 FOOT NORDUYN NORSEMAN



For information call Pat Grubbs at:  
**(916) 985-6130** or write **MDM Co. at:**  
P.O. Box 739  
Rancho Murieta, CA 95683



# Returning

# Quiet Flight

by JOHN LUPPERGER

**A**S YOU CAN TELL by the header, this is a new feature for *Model Airplane News*. I'll be writing about sailplanes and electric-powered planes. I don't have a degree in aeronautics, engineering or electronics, and I don't work for any of the aerospace companies. However, I do have a great love of model aircraft, especially those which fly quietly. I hope that this will enable me to write an interesting column, to pass on information, and to make your hobby a little more enjoyable.

I've been involved with radio-control modeling since 1976, and have designed several models during that 12-year period. Some of the models I've designed have been kitted: Balsa USA's 2-meter Allure, Midway Model Company's hand-launch and 2-meter Gnome, Pilot's 2-meter Harlequin, and JM Lupperger Plans hand-launch BODST. I've also designed a few successful electric sailplanes, and have several more designs in the works (either in the planning stage, or already on the drawing board).

I hope to keep you informed of new products, new building techniques, and new aerodynamic findings that will help you build better models. I also hope that you'll get involved in the column by sending in information and photos of your models and the events that you've attended (preferably black and white photos). This column should reflect *your* interests, and not just be a place for me to express *my* views and opinions.

## News From Europe

Rumor has it that, at the next meeting of the CIAM and the FAI Rules Committee,



Removable nose cone of Winsome fits snugly over the forward section of the fuselage. This is a very strong and aerodynamically clean arrangement.

a strongly backed proposal to remove the speed task from F3B events might pass. This, along with the possibility of organizer-supplied winches (another proposal that might pass), could greatly change the entire F3B flying scene. One of the European magazines went so far as to say: "F3B may finally become an event for the masses." If the organizers supplied the winches they obviously wouldn't be worth several thousand dollars each (and you may find it hard to believe, but many of the winches used in F3B are worth that kind of money), and they obviously wouldn't be as powerful as some of those presently in use. It might even become necessary to thermal during the six-minute duration task. This is something

and somehow manage to pull it off) they wouldn't be able to beat the American flyers. I'll keep you up-to-date as soon as more information becomes available.

## Model Of The Month

In each column I'd like to feature a model that's particularly interesting for one reason or another. It may be a relatively unknown import, or a scratch-built model, or even a kit that's exceptionally well done or has some interesting modifications.

This month's model is owned by Dieter Lamprecht of Huntington Beach, CA. Dieter's model is a Columbus by Model-Bau Krause of Germany. At present, I don't think anyone in the U.S. is importing



A gathering of the Electric Fun Flyers shows a large following for the old-timer type of model. A couple of sailplanes and power-type models were also present.

that at present, with the great heights that are being reached directly from launch, is almost nothing more than a glide to the ground.

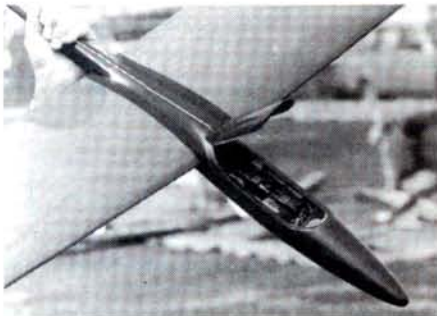
With only duration and distance tasks, we may finally start to see greater support for F3B here in the States. We may also see a change in the sailplane's design, and this would allow fewer high-tech models to be competitive. In England they're even saying that a purpose-designed poly-ship might be competitive. I've always felt that if the Europeans had to fly true duration (you know, the kind where you still need 4 minutes at only 50 feet,

this model. This is a shame, as it's a real beauty. The Columbus spans 3 meters and uses the little-known Eppler 212 airfoil. This undercambered airfoil can carry weight well, and also has a very



Dennis Brandt shows off the clean lines of the Winsome's fiber glass fuselage. A possible kit available later this summer.



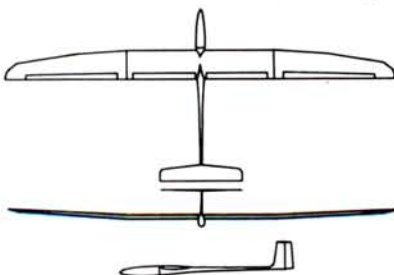


*Airbrake on Columbus not as effective as spoilers. Much simpler in operation. Might interfere with rudder on conventional model, but no problem on V-tailed Columbus.*

broad speed range. The Columbus weighs 4.5 pounds. I've seen it fly around like a floater and, on the same flight, streak across the sky like a bat out of hell. It does all this at a dry-wing loading of 10.65 ounces to the square foot. The model features foam-core pre-sheathed wings and tail surfaces. The control functions are V-tail (electronically mixed for rudder/elevator), ailerons (electronically coupled with rudder) and, its most unusual feature, a canopy airbrake. Each aileron is driven by its own servo and the whole thing is controlled by a Futaba 8-channel PCM. Even though the Columbus looks like an F3B machine, it's really at home doing what most of us enjoy best—thermaling. If you have an interesting model, send me a picture and a full description and perhaps I'll feature your ship in a future column. (Remember, black and white photos whenever possible.)

#### Possible Future Kit

If you've been involved in soaring for more than just a few weeks, you've heard of Larry Jolly. Besides doing R/C flying



for the movie industry, Larry has, at some time or another, won almost every major soaring event. Somehow he still finds time to run a kitting company that produces everything from 2-meter trainers to cross-country sailplanes. Larry and his father, along with Dennis Brandt, have come up with a new unlimited ship that should have a broad appeal. The Winsome is a combination of high-tech European styling and aerodynamics, featuring good old built-up flying surfaces for balsa hackers.

The wing spans 129 inches, with a wing area of 1,089 square inches, and an



*Dieter Lamprecht with his V-tailed Columbus model. Talk about an idyllic scene! Flying in late October in short sleeves and shades, and gently swaying palm trees in the background.*

aspect ratio of 15-to-1. The wing sports Schuemann-style tips which are very popular in Europe (through their use on full-scale sailplanes). These are supposed to enhance wing efficiency by reducing tip vortices. Control functions will be rudder, elevator, ailerons, flaps, and spoilers (optional, from the look of the 3-view drawing). The wing, which appears as though it will be fully sheathed, will use the Eppler 374 airfoil. This airfoil is listed by Dr. Eppler as being best suited for aero-



*John Amies' flying boat taxiing out, getting ready for another great flight.*

batic slope soaring, but it's proved to be an excellent section for thermal soaring. It has a moderately high cruise speed, and can really move out without the addition of ballast. I have a small 7-cell electric which uses the 374; its wing loading is 16.9 ounces to the square foot, yet it thermals quite well. If you look closely at the Winsome's 3-view you will notice that it has a flat center section with very slight poly in both tips. This should add greatly to the plane's stability (especially when thermaling at high altitudes)—instability puts many modelers off when considering an aileron model.



*John's flying boat a moment before touchdown. The pit area for the entire flying field can be seen in the background.*

The fuselage will be fiber glass and, as can be seen in the photos, is very clean with very appealing lines. The fuselage features a European-style removable nose cone with a difference. Unlike the European models which have ply keels, the Winsome has a full fuselage under the nose sheath. This should make radio installation easier, and should also make the fuselage much stronger in this area. I'll keep you informed of progress on the prototype, and on kit availability. The kit should be available late this summer.

*(Continued on page 84)*



# MOVING TIME...

by RAY STARK

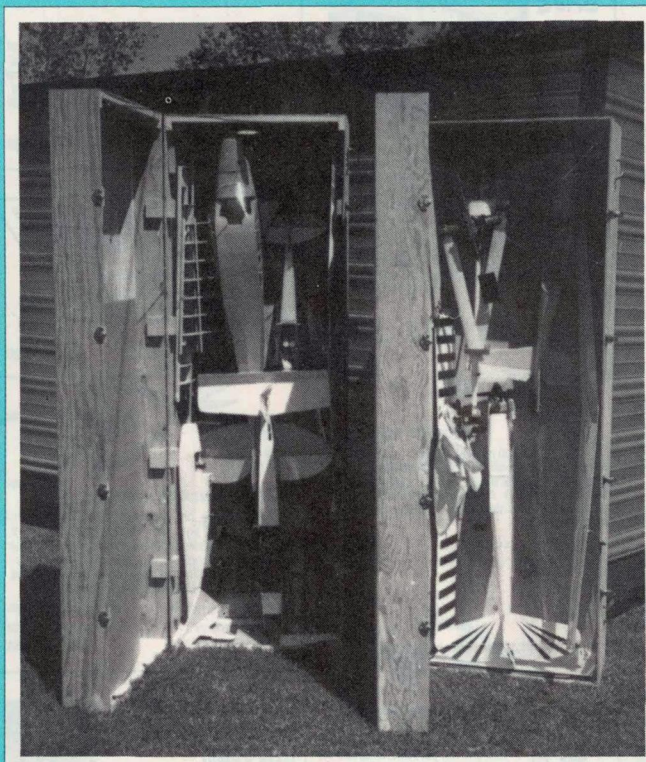
**O** THER THAN "battery failure," which two words strike complete terror into the heart of the avid R/C enthusiast? How about: "Moving Time!"?

I really hate moving, especially when it comes to packing up all the goods in my hobby room. To some people this seems silly as they crash airframes at a rate approaching or equal to their building rate. Fortunately, I haven't had this problem. If the planes have been protected by the methanol gods, who wants to entrust them to the noodleheads hired by the moving company? Not me!

One easy solution is to toss your planes into the car. Early on, with only one or two models, it's easy to rationalize how their right of passage supercedes that of the family mutt. In fact, for short local moves this is a realistic option. What about cross-country moves though?

For my first R/C kit (Aquila) I built a quickie box just to house a single plane. This worked well but what do you do when you have a hangar full of planes, one copter and some parts in mid-construction?

I decided to make a big box to put them all in. I selected the cheapest grade of 1/4-inch plywood and built what my neighbors thought was a coffin. I reinforced all the corners with furring, and used draw catch latches and hinges to attach the top. The models were arranged to fit inside and wired (usually at the landing gear) to whatever surface they fit best. The wings were sorted in a lid compartment which was made by stapling a piece of cardboard to the furring edge. Handles on the outside helped the movers carry the unit. No models touched each other and, after one cross-country move and one cross-town move, I can say this is the *only* way to go. The box also makes a really handy place to store airframes which you don't have room for elsewhere.



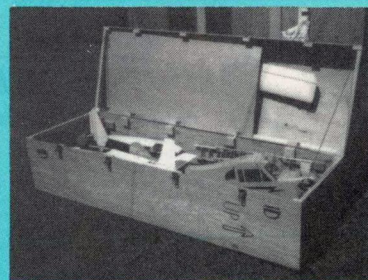
I've outgrown my first box and am now making the second. The only change I'm making to the original design is that rather than using small oak blocks at the hinge and latch area, I'll run furring along both the lid and box edges and use nuts and bolts to attach hardware rather than wood screws.

**CONSTRUCTION:**  
We're not talking cabinet-quality construction here. It would be a shame to do a nice job on a shipping container only to turn it over to the movers. Mine worked fine. Here's what I used:

- 2 sheets 1/4-inch ply in standard 4x8-foot size (ask if the store has damaged sheets as these are often cheaper)

## Transporter Case To Protect Your Models

*Tailored container makes transporting your models painless. Note ply separator in top compartment.*



- 4 mild-duty hinges
- 4 draw-catch latches
- One 1/2x3/4-inch (or similar) furring (enough to reinforce all edges, corners and lid openings)
- 8 brass corner protectors (optional)

Saw both of the plywood sheets in half, and then cut four end pieces from the short ends of all four sheets. Discard two of the four end pieces and use the remaining two. Pin the box

(Continued on page 84)







# Small Steps

by RANDY RANDOLPH

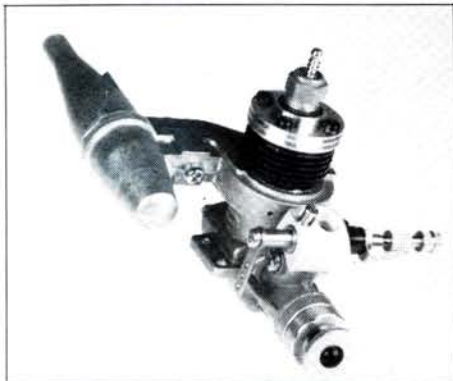
**T**HANKS TO ALL OF YOU who've written with suggestions and comments. I think I've answered all of them but, if I haven't, I will! Now for some letters.

Michael Miller, of North Hollywood, CA, writes: "Finally, I have somewhere to write to about small airplanes. Most of my information comes from whoever built a small plane that month. I know there are many of us small plane enthusiasts out there and I'm hoping your column will help us to network. I've nothing against large aircraft, but I just don't have a van!"

"I'm looking for plans of World War II aircraft, in the 40- to 45-inch wingspan range, to scratch-up around my nifty little K&B Sportster 20. An occasional .20-size warbird in the plans section would be great! If any modelers are hoarding plans, please notify this column."

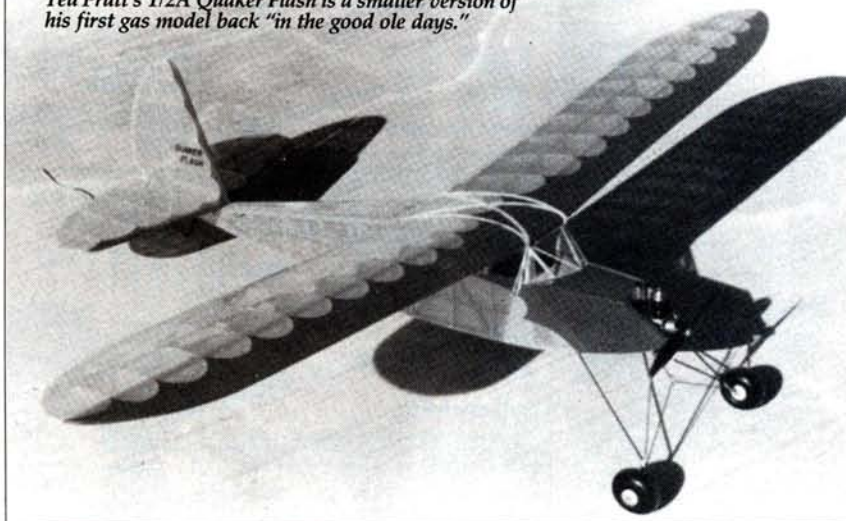
**EDITOR'S NOTE:** How about our Sport Scale Mini-Warbird like the T-6 (plan No. 4821), P-51 (plan No. 4832), P-47 (plan No. 6843) or Wildcat (plan No. 9791)? The K&B would be perfect.

Thinking about Michael's letter: This column could act as a clearinghouse for those who want to list their plans for small airplanes and for those who want specific plans. My friend Joe Wagner has a lot of plans for the smaller birds, but how about the larger, .15 to .25 beauties? If you think such a clearinghouse is a good idea, let us know!



The G-Mark .061RC—a small engine with a throttle that works! See Antonio Mizzan's letter.

Ted Pratt's 1/2A Quaker Flash is a smaller version of his first gas model back "in the good ole days."



From Ted Pratt, of Pahrump, NV, comes a comment about one of the oldest manufacturers in the hobby business:

"Several months ago I bought a pair of Trexler pneumatic balloon wheels for the Flyline\* Quaker Flash I was building. The model is finished, has an Ace\* Commander radio and is fun to fly. It's approximately one-half the size of the Q.F. that was my first gas model powered by a Bunch Gwinn-Aero.

"The Trexler wheels must have been in the hobby shop a long time because they soon cracked and wouldn't hold air. I wrote to Trexler asking for a new set of tires to put on the hubs that are mounted on the model. Sixteen days later I received a new set of wheels and *no bill!* That's unheard of!"

Ted's experience is not unique. Most hobby manufacturers are very concerned about the quality of their products. In fact, most of the people who run these companies are long-standing modelers. Treat them fairly and they'll usually do the same for you.

The Philippines have been in the news lately, and the next letter is from Antonio Mizzan who shares some of his experiences flying in that tradewind-swept country.

"I'm an Italian geotechnical engineer

living in the Philippines—a former light-plane pilot and free-flyer at heart. However, for practical reasons, I do fly small R/C models which I can take with me on the job. I welcome your "Small Steps" in *MAN* magazine.

"Normally I fly diesels, such as the Dart .5cc (.035 cubic inch), a Barbini 1cc, a PAW 1cc with R/C carb, and also some Cox reeds and TDs, running strictly on FAI-type fuel (no nitro), as nitro isn't available here. On the small Dart I use a single channel, while on larger engines 3 or 4 channels are mandatory. I also fly R/C-assisted motor gliders with a 2-channel Black Widow engine up front.

"I think Cox engines are not suited to R/C because of their inflexible speed range—only high speeds without nitro. Adding a head gasket improves their starting characteristics. Even a Tarno carb on a TD .049 doesn't work very well. On the other hand, the G-Mark .06 carburetor operates much more smoothly. The Cox TDs and reeds are used mostly on motor gliders, and the PAW 1cc and the OS.10 loop-scavenged engines are used for 3- or 4-channel work.

"Most of the Filipino modelers fly 4-channel bombs, i.e., heavy models, which can cope with the constant monsoon winds. They have engines mostly in the



.25 to .40 range, and run without nitro except for a few drops doled out sparingly for start-up. We all fly our models in undeveloped villages, and use abandoned concrete roads as runways. We have no preference between 2- or 3-wheel landing gears.

"I'd appreciate more information on what American modelers do on smaller models. I'd like to learn about your construction techniques, covering materials, control linkages, glues (cyanoacrylates are seldom found here), and possibly how to tame the Coxes for R/C use since these engines are so light and practically vibration-free. Most of my friends have them, but keep them stored away."

About the only thing that can be suggested to "tame" the Cox engines is the throttle sleeve for .049s from Ace Radio. I know they work when the fuel is laced with nitro, but have never tried them with straight FAI-type fuels. They should work though!

The first photo shows two Dragonfly aircraft locked in mortal combat. Some years ago the Dallas R/C Club held a combat contest limited to airplanes having a minimum of 600 square inches of wing area and no more than a .15 engine. Forty-foot streamers were tied to the tails, the idea being to cut other fliers' streamers. Dragonfly, a design published in *Model Builder Magazine*, was the most popular



Electric motor mount J-Tec bolts to fire-wall like an engine mount.

airplane entered, and combatants fought very slowly but furiously! It was fun to fly as well as to watch because everything seemed to be in slow motion. Very few streamers were cut and there were some mid-air collisions, but no damage resulted and the only airplane lost was the fastest one—a tri-plane.

The second photo shows an electric motor mount from J\*TEC\*. In case you've forgotten, a lot of electric-powered airplanes fall into our category. In fact, a number of .10 to .15 glow-engine ships could be converted to electric, and the J\*TEC mount would help in that respect. I sometimes fly an electric-powered version of the Twiliter II in the front yard after work. It's quiet and there's no clean-up afterwards!

So long for now and remember, when you write, send only glossy black and white photos, please!

*\*The following are the addresses of the companies mentioned in this article:*

Flyline Models, 10643 Ashby Place, Fairfax, VA 22030.

Ace R/C Inc., 116 W. 19th St., Box 511C, Higginsville, MO 64037.

J\*TEC, 164 School St., Daly City, CA 94014. ■



Dragonfly combat! See text for the low-down!



"Warm hands make winter flying safer, more enjoyable"  
Nick Zirolì

INTRODUCING A NEW COLD WEATHER FRIEND YOU CAN COUNT ON—

## TRANZMITTEN®

- Simple, yet very effective
- Keeps out wind and cold
- Will not restrict hand motions
- Made in USA by AMA modeler
- Fits any Tx - Sturdy construct.
- Polyester filled nylon quilting
- Cotton jersey lining - I.D. label
- Velcro closures - fast, sure fit
- Choose: Red, Blue, Brt. Orange

AMA patch not included - send yours - we'll sew one free

NO POSTAL or HANDLING FEE  
send patch, color choice, and

**\$19.49** to:

SKY-HI ENTERPRISE  
422 E. 20th Ave. #2  
COLUMBUS, OHIO 43201  
SATISFACTION GUARANTEED



FOR THE R/C CAR  
ENTHUSIAST  
ON NEWSSTANDS  
AND IN HOBBY  
SHOPS EVERYWHERE

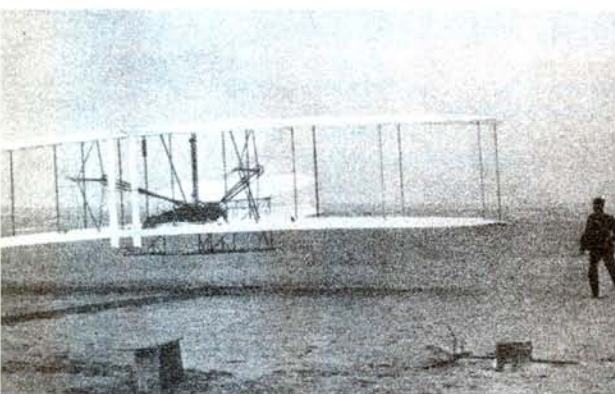




WRIGHT FLYER (1903)



SOPWITH CAMEL (1916)



SPITFIRE (1936)



MESSERSCHMITT Bf. 109E (1939)



DOUGLAS DC-3 (1935)



LA FEDERATION  
AERONAUTIQUE  
INTERNATIONALE  
PRESENTS

# THE WORLD'S

The complete and authoritative collection — 25 handcrafted pewter sculptures spanning the entire 85-year history of aviation.

The world's official authority on aviation history, La Fédération Aéronautique Internationale of Paris has recognized and authenticated every major development in the history of aviation from the Wright Brother's historic first flight in 1903 to the *Voyager's* recent globe-circling odyssey.

And now this prestigious organization is issuing its first collection, entitled "The World's Greatest Aircraft." Twenty-five precision-detailed pewter miniatures spanning the entire 85-year history of aviation. Tracing each major development in aircraft technology — from pioneers like Lindbergh's *Spirit of St. Louis* and the *Sopwith Camel*...to the state-of-the-art *F-14 Tomcat* and supersonic *Concorde*.

Each famous plane is sculptured and spin-cast in fine pewter to capture the most intricate details. Hand-assembled and hand-finished, each is "in flight" on its pewter display stand. And the entire collection will look spectacular in its custom-designed wood display.

The issue price for each work in fine imported pewter is \$27.50. And the wood display is yours at no additional charge.

Handcrafted to the highest standards by The Franklin Mint. To be as enduring as the spirit of aviation.

Each of the sculptures in this series has been modeled after an original aircraft; they have not been authorized or endorsed by any manufacturing or airline company, nor will they be manufactured in facilities operated by those companies. The Franklin Mint will produce the sculptures under the official authorization of La Fédération Aéronautique Internationale.

The custom-designed wood display — measuring 21½" tall and 20½" wide — is provided to house your collection.



Construction

# OSPREY

by JOE WAGNER



*Classic '30s lines evident in this view as the Osprey passes overhead. Pretty sight!*

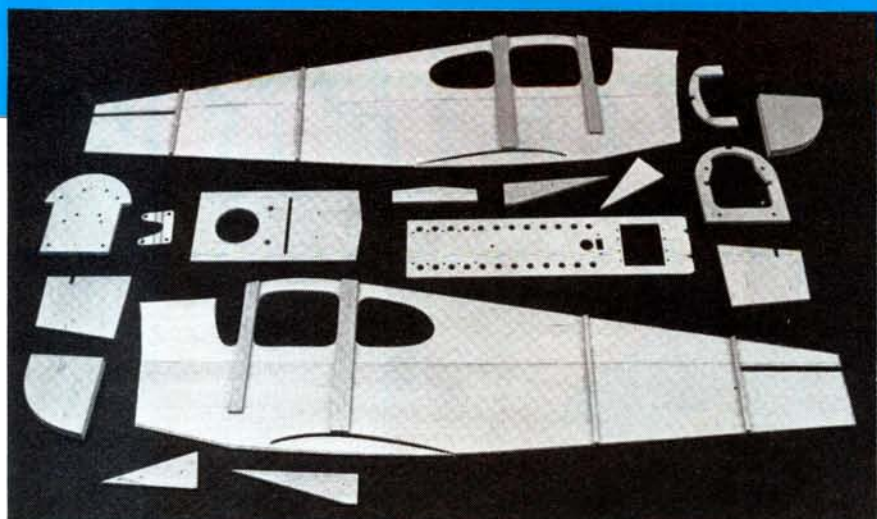


*The Osprey's working parts, all attached to the plywood track behind the firewall.*

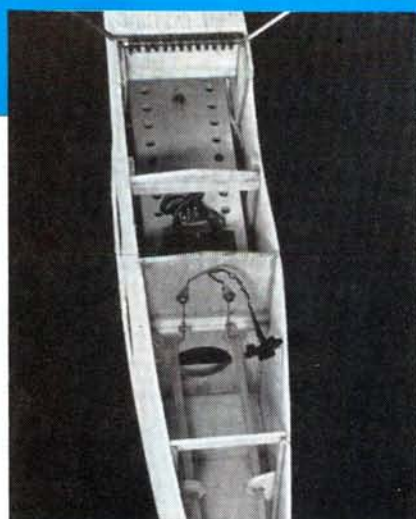
**L**IKE MOST of my model designs, the Osprey is a blend of the old and the new. Its old-fashioned features are obvious: the cabin biplane layout with its 1938 decoration scheme; and the all-sheet-balsa configuration, strongly reminiscent of my 1949 Veco Dakota 1/2A free-flight model.

The Osprey's *new* features are less visible, and include the R/C installation. The model doesn't have detachable wings or removable hatches, yet all the radio equipment is easily accessible.

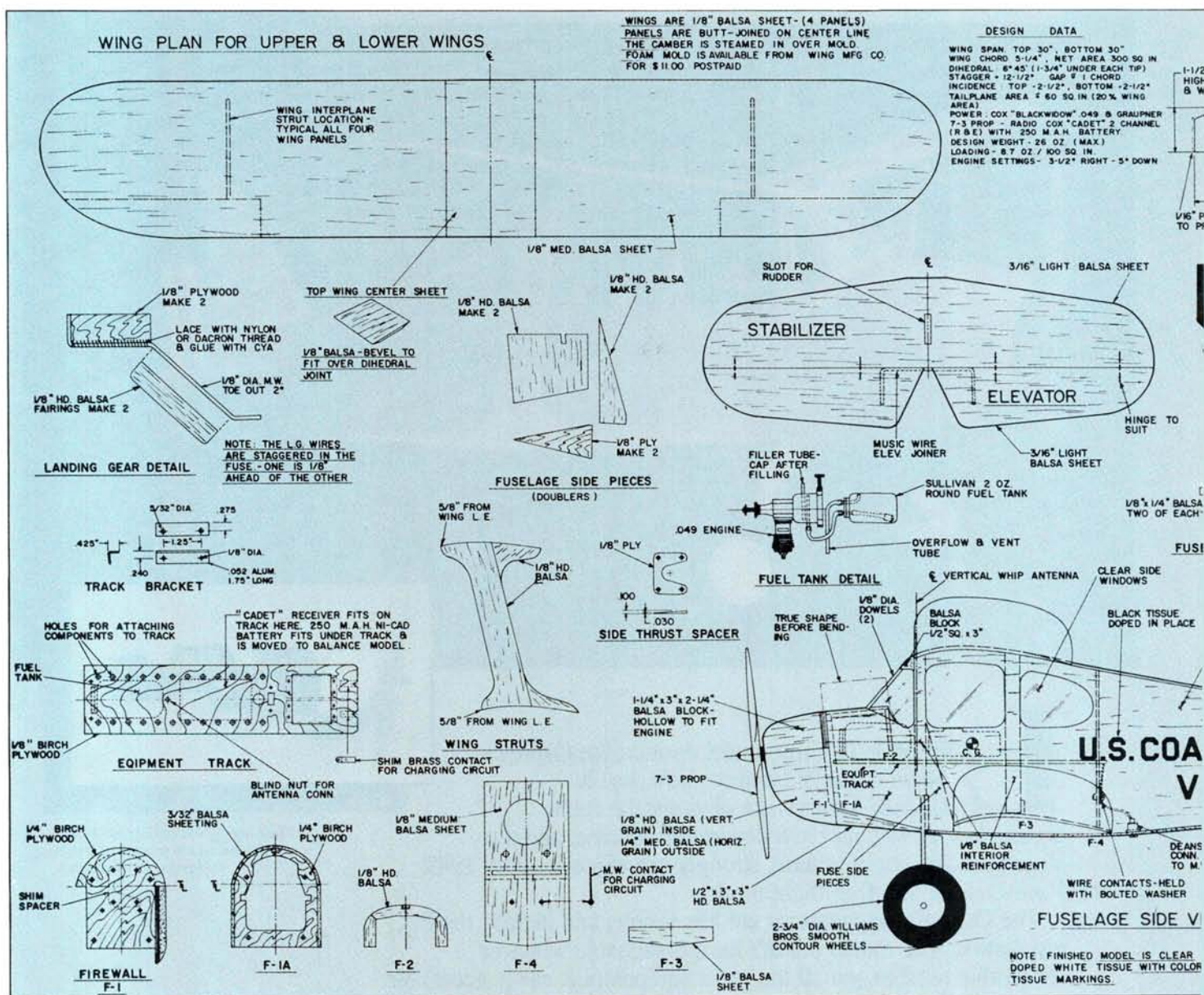




The Osprey's fuselage parts. There's not a lot of them—but they do have to be cut accurately.



Looking up into the fuselage rear interior shows the pushrod guide installation and the battery charging contact wires.





## Order the Full-Size Plan



### #3881 THE OSPREY PLANS \$10.50

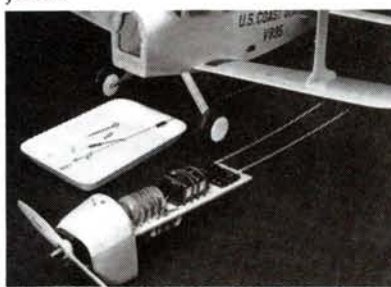
This 1/2A all-balsa cabin biplane is simple to build and incorporates some unique design features like easy-to-duplicate molded balsa wings and a slide-in radio and engine tray to provide total equipment access. The combined wing area is slightly over 300 square inches, which gives the Osprey a comfortable wing loading in the 12 to 13 ounce per square foot range; perfect for slow, relaxed flying. A sure hit for small fields.



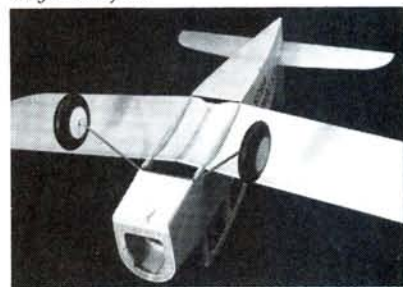
*Making a dihedral joint. Pinning one wing panel to its forming mold keeps the airfoil from distorting while the panels are being joined.*



*Cut-out tissue letters are easy to keep aligned if they're left attached to a "base strip" until they're doped in place. Then they're cut free.*



*Just before final assembly for flight. The foam tray contains all the attaching hardware needed.*



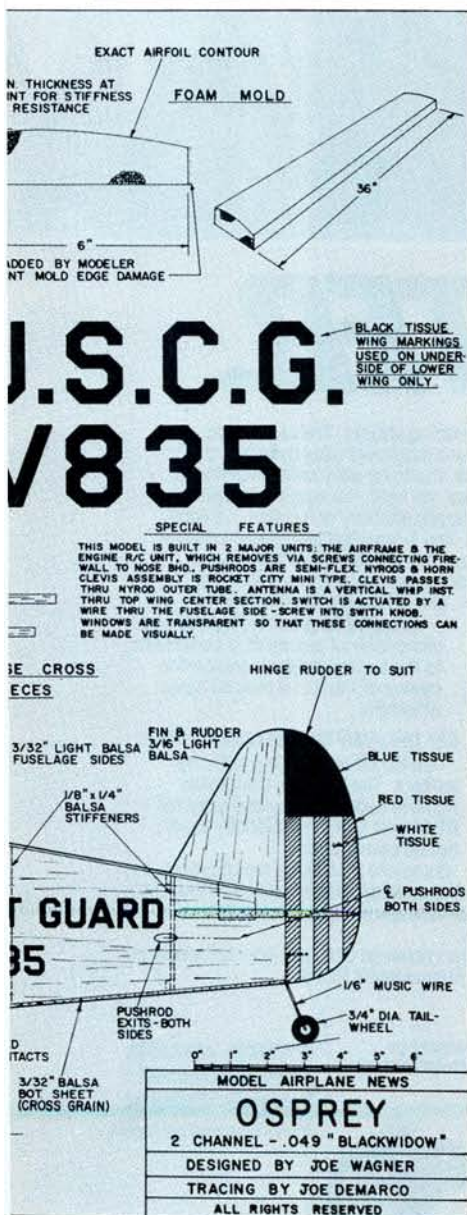
*Installing the lower wing. Notice the cut-away trailing edge at center, so the bottom sheeting can fit properly over it.*

How? It's all mounted on a sliding track that's attached to the rear of the engine section. To get at it, you just unscrew the whip antenna and the switch actuator, and unsnap the clevises. Then, the whole engine and R/C assembly slides right out of the front of the airplane.

Another of the Osprey's innovations

available for \$11 (postpaid). Order catalog No. JW-DD-183.

The airfoil-forming mold is extremely useful; wings of any chord from 2 to 6 inches can be formed on it. I've used mine to make light, strong and efficient wings for several fine-flying model designs, from tiny rubber-powered free-flyers to R/C models



*The finished product! Be careful when installing the interplane struts: if they're not glued in exactly the right place, they'll warp the wings.*

is the way its sheet-balsa wings are steam-formed to their airfoil. The process does require a mold, but if you don't want to go to the trouble of making a hardwood mold like mine, Wing Manufacturing\* has a foam one

such as the Osprey. There are more on the way!

Here's how the wings are made. You begin with a rectangular sheet balsa blank of the proper dimensions. First,

*(Continued on page 76)*



# Floating Around

by JOHN SULLIVAN



*Pete Lafferty's DHC-2 Beaver touches down at 1987 Clearlake Fly-In.*

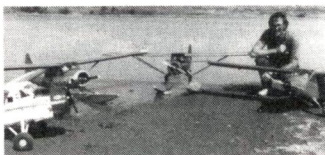
**T**HE DE HAVILLAND DHC 2 Beaver is one of the most readily recognized floatplanes in the world. There's no doubt that the sheer number of Beavers produced (over 1600), and the fact that they can now be found all over the world, contributes to this



*Roger Grotheer fine-tunes O.S. Surpass 120 4-stroke while Pat Grubbs holds; Woodland Modelers' October Float Fly.*

instant recognition. However, I like to think there's something more primal here. The Beaver has the magical ability to start you thinking about fishing trips, evergreen forests, snow-covered peaks and mountain lakes the minute you set eyes on it. It's a wilderness classic that can tell you what it does best by the way it looks.

My fascination with the plane began years ago while paging through an old fishing magazine in the local barber shop. The picture I recall showed the Beaver



*Left to right: D.H. Otter, Beaver, Noordyn Norseman, and Pat Grubbs, U.S. distributor for Unionville Hobbies and D.H. Turbo Beaver.*

nosed in to shore. There was a canoe strapped under the fuselage, icy blue water stretching to the horizon, and two guys standing on the floats with a string of trout (every one as long as your forearm) stretched between them. These guys were smiling and I remembered that.

Over the years I kept seeing pictures of the DHC 2 but never got near one. Then, in May of '87, I spotted a model of the radial Beaver at the Clearlake Float Fly. This was the nearly completed Beaver, built by Alan Johnson and equipped with Jimmy Durham's retractable amphibious gear. The Beaver is one of the largest single-engine aircraft ever built, and when looking at Alan's model I could, for the first time, get a sense of the plane's proportions. It's sort of a cross between a DC-3 and the Fairchild Radial. It's big and roomy inside with plenty of aesthetic eccentricities like a bulky fuselage with high-aspect ratio wings, two doors on each side and three kinds of windows:

wrap-around, trapezoidal, and porthole.

Then and there I decided that I wanted one. Alan gave me the name but no address of the manufacturer (Unionville Hobby\*) and the name of an individual to contact who reportedly had access to the kits. As my regular readers already know, that particular source had disappeared, so I put the word out in the November '87 issue (which was written three months in advance, in August) and waited to see what would happen.



*Pete Lafferty, Harrisburg, OR, preflights his 35-year-old, completely restored DHC-2 Beaver. 450hp, 9-cylinder P&W radial.*

In the meantime, I received word from Jay Frey of the EDO Float Corporation that there would be a full-scale float meet at the Bluebird Resort on Clearlake during the first week of September '87. I contacted old flying buddy George Graff, and we made the two-hour trip from Napa Valley on Saturday, the second day



of the meet. There, starting a takeoff run parallel to shore, was a completely restored cream-colored de Havilland Beaver on aluminum floats. My quest for information on the Beaver (at least the full-scale version) was definitely getting somewhere. During the course of the day, George and I photographed the Beaver dockside, met its delightful owners, Pete and Joanie Lafferty of Harrisburg, Oregon, had an incredible demonstration ride in the plane, and then went back up in



A pair of classics at the Clearlake Fly-In: J-3 Cub on Edos, and DHC-2 Beaver on De Havilland floats.

Hank and Alice Strauch's float-equipped Cessna 180 for a one-hour air-to-air photo session! To someone like yours truly, who lives and breathes floatplanes, this was nothing less than Christmas in September!

You have to appreciate that, unlike land-based aircraft, a floatplane can legally fly below 500 feet. This fact, coupled with the Beaver's amazing slow-flight characteristics and Pete's propensity to fly with trim, gave George and me one of the most beautiful, low-flying, meandering flights you could imagine. Clearlake is the second largest natural lake in California, and its shoreline runs the gamut from sandy beaches to finger marshes to mountains with waterfowl—with marinas and serpentine shoreline roads thrown in for good measure. At one point in the flight we had a flock of mallards coming up off the marsh on our right, a ski-boat blasting along on our left, and pristine Cubs on floats ahead and above us at the same time. Oddly enough, I chose to set the camera in my lap and stare at the raised de Havilland emblem on the dash. It was just too much!

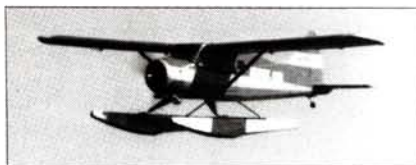
The ride in Hank Strauch's 180 was different but no less exciting. We took the right-hand door off the Cessna for the air-to-air shots and this allowed all that unmuffled engine noise and prop blast into the cabin but gave George and me the opportunity to watch the right float go through all its phases from displacement to step planing. With all the din, spray and rushing air, it was an incredible experience. Once in the air, the photo work was a snap. With headsets for communication,



Airborne over Clearlake, Pete Lafferty's DHC-2 drones merrily along. Note sub-fins on horizontal stab.

Hank's rock-solid piloting, Pete's ability to position the Beaver perfectly and an 80-200 zoom on my Nikon, the entire session was about as stressful as shooting table-top still lifes. Budd Davisson, the game is up!

The month following the full-scale Clearlake fly-in was relatively quiet Beaverwise. George and I gloated about our good fortune for about three weekends until everyone at the lake was sick of us, and then the November issue of *MAN* came out with my request for information



Unionville Hobbies' 8-foot De Havilland DHC-2 Beaver uses O.S. 120 4-stroke.

on the Unionville Hobby Beaver kit. Within a week the first packet of forwarded mail arrived; three days later, another packet and, a week later, even more. I received too many to mention individuals or particular hobby shops, but I do thank everyone who responded. I now have the world's largest repository of Unionville Hobby information.

Unionville Hobby is in Markham, Ontario, Canada. They manufacture a line of 14 radio-control aircraft kits, some of which come pre-built. The planes range from trainers to sport types to semi-scale to 8-foot behemoths scaled down from de Havilland factory drawings. Their most popular kit is the Club Cricket, a smooth-flying trainer with excellent low-speed response, but the kits that appeal to me are from their Canadian Heritage series. These include semi-scale 5- and 6-foot versions of the Norseman, Beaver and Otter plus a 51-inch Canadian version of the Tiger Moth with an all-weather canopy. Top of the line in the Heritage series are the scale, 8-foot de Havilland

Beaver, Otter and Turbo Beaver, plus a 7-foot Norseman and J-2 Cub.

In Canada, the Unionville line is advertised as a "known quality" kit along with Goldberg, Sig and others. Based on the mail I've received and the kit I bought (more on *that* in a minute), I agree. In all the mail, I didn't read a single negative comment, and one guy sounded as though he was on his way to building every kit in the line. The 8-foot Beaver which I procured came from Pat Grubbs\* of Sacramento, CA, who distributes the Unionville line in the United States.

Pat not only informed me of his distributorship, but invited me to see four of the Unionville planes fly at the Woodland Float Fly in mid-October! Needless to say, I accepted and, as you can see from the photos, Pat *did* have all four planes there as well as the demonstration services of my Clearlake test pilot, the uncontrollable Roger Grotheer. Roger did an incredible job of scale flying. A 120 4-stroke doesn't sound quite like a 9-cylinder Pratt & Whitney but, short of that, the Beaver flew exactly like its full-



This seven-foot Noorduyn Norseman from Unionville Hobbies is powered by an O.S. 120 4-stroke.

scale counterpart. In addition, although I've never seen the other full-scale versions fly, I have to assume that the Otter, the Norseman and the Turbo did similarly well.

The most impressive flight of the day occurred when I was dragged kicking and screaming over to the Woodland Modelers' landing strip which is adjacent

(Continued on page 60)



# Jet Blast Special



View of aircraft line-up; participants and spectators. Serious fannin'!

**I** ENJOY WATCHING things grow... flowers, trees, kids, IRAs, CDs—those kinds of things! It's also no secret that I'm a dyed-in-the-wool ducted fan fan. These two elements are key to capturing my feelings when I returned to Ft. Worth, TX, last September for the Fifth Annual Great Southwest Fan Fly. I've watched this gathering mature from the idea of a small group of Texans from Austin to its present level, and fully expect even bigger and better things in the future. We've had some preliminary discussions about regional fan flies; but more about that later.

Following the axiom that you should never change a good thing, the Mid-Cities

## Fifth ANNUAL SOUTHWEST

Beautiful Sterner F-80 by Jim Howard. Dynamax driven, unflown at meet.



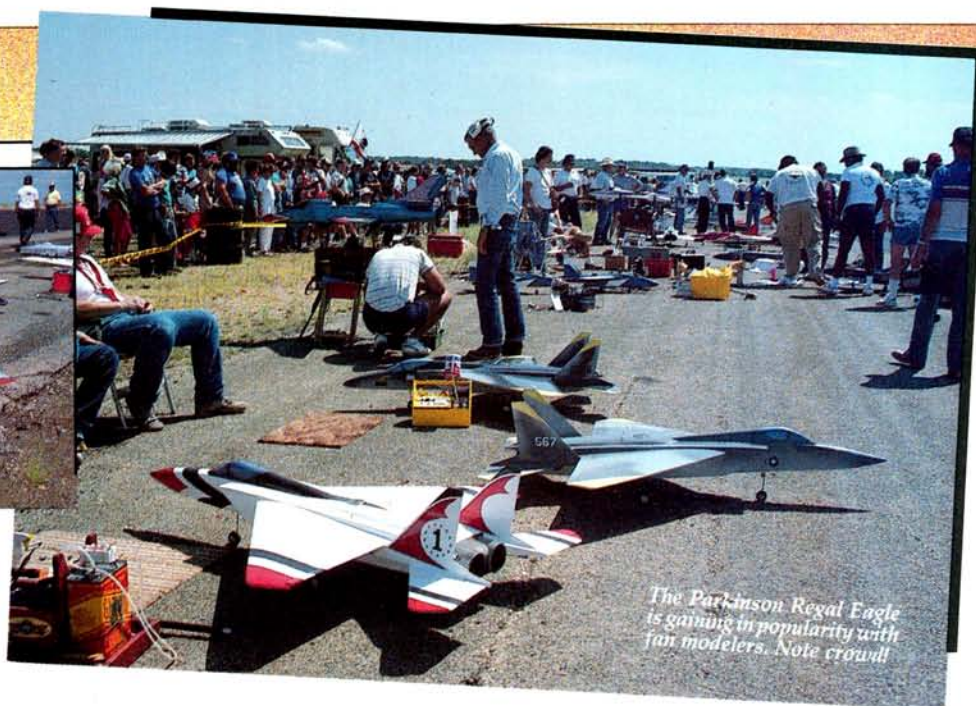
Dennis Crooks' JMP Starfire II taxis by while Terry Malcolm "bullets" around.

R/C Club invited Dawn Buckley and Ed Couch (the co-directors of the previous year's event) back for an encore performance—and surpass their previous efforts they did! They ordered nearly perfect weather with just a breeze down the runway's center line. Well, they *ordered* great weather; what actually arrived on that morning





Frank Tiano lends Ron Schaefer a hand with his uniquely finished Violet Aggressor. Frank claims it's Serbo-Croatian camouflage!



The Parkinson Regal Eagle is gaining in popularity with fan modelers. Note crowd!

by RICH URAVITCH

# FAN FLY

**More Air Was Moved This Weekend Than In The Bahamas During Hurricane Season...**

were thundershowers which could have irrigated the entire District of Columbia for a year! The rain did, however, subside by late morning, giving way to bright sunshine.

Participants came from as far away as



Flying Models' Frank Fanelli and Hurricane Fans' Steve Korney discussing fan installation in Steve's Mirage.



Ed Couch's A-4 Skyhawk from the Byron kit. Australian markings are attractive.



Ed Couch's nearly finished Republic F-84F Thunderstreak. Beautiful model design by Lyn McCauley.





Ron Able's Byron Eagle was test-hopped at the meet. Piece of cake! Test aircraft markings are vivid.

Florida, Washington State, and New York. That's about as far as you can practically stretch U.S. geography. Next year they'd like Hawaii and Alaska represented as well!

The people who you'd expect to be back with some new, exciting things certainly were. One of these is Austin's Mike Kulczyk, a craftsman in every sense of the word. Mike showed up with a flawlessly executed D.H. Sea Vixen powered by a pair of O.S. 25VFDF engines driving the RK-20 fan units. The unique twin boom configuration model had over 1,000 square inches of wing area creating the lift for its nearly 13 pounds of weight, yet it flew quite realistically, even regally. The engines seemed very quiet and always "on song" as our British friends say. Unfortunately, the Vixen bought it; rolled over and went in vertically. Lots of speculation as to why, but the cause may never be known. Since Mike doesn't seem to build kits, we will, no doubt, see something unusual and nearly perfect from him again next year—probably British also! We presented Mike with the annual Jet Blast Publisher's Award for Technical Achievement.

Last year's winners, Terry Best and Paul Appelbaum, returned with a number of hot rod F-15 Eagles from the Zirol plans. Equipped with homebrew fan units with K&B\* 7.5



Stealthy Chris Abate (on right) seems to be intent on stealing Bob Violett's Sports Shark. Bob won, hit Chris with transmitter!

engines, these guys were rocketing around the sky for most of the weekend, but the real missile in their squadron was Terry's new design which he calls the "Invader." It can best be described as subscribing to the Cook/Violett philosophy of sport fan airplanes rather than scale subjects. It looks a lot like a scaled-down Cook\* Starfire with very little scale-down in performance. I tried to talk Terry into doing a construction article for us, but someone beat me to him (thanks, Frank!). I *am* glad to hear that the article will be written though, as we really need more scratch-built designs for those who still prefer to build from plans.



Above: One of the Sky Rider's Byron Bullets, frequently flown and fast. Left: Dennis Crooks' attractive JMP Starfire, this being the original version.



Mike Kulczyk's outstanding DH Sea Vixen flew very scale-like and nearly noiseless. See next page for unfortunate ending.



"Prank" Tiano strategically places intentionally destroyed rotor near Viper tailpipe to "rattle" Bob Violett. Didn't work!



Austin's Terry Wyson with BD-40. Turbax I and O.S. 46, flies great!



Paul Appelbaum (left) and Terry Best fire up one of their Ziroti-designed F-15 hot rods. Home-brew fan provides excellent performance.

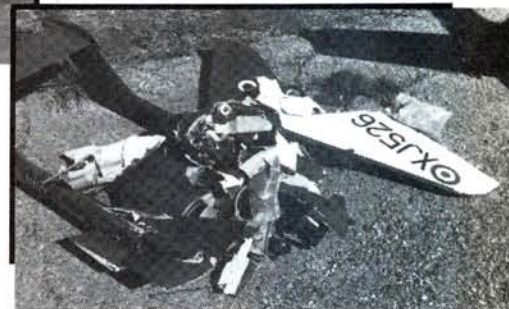


The fourth annual installment of the Butch Sickel/Concorde visitation was concluded this year with the great white bird actually looking as if it was nearly ready to go. Butch was working closely with Lyn McCauley on

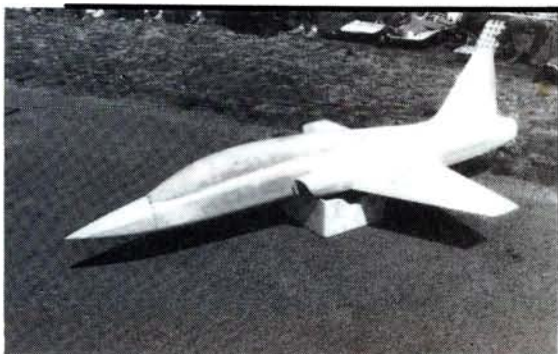
(Continued on page 84)



Above: Butch Sickel's Concorde. Left: Chris Abate provided Loctite products gratis to participants.



A real heart-breaker, Mike Kulczyk's Sea Vixen after crash. Unfortunate reality of aero modeling.

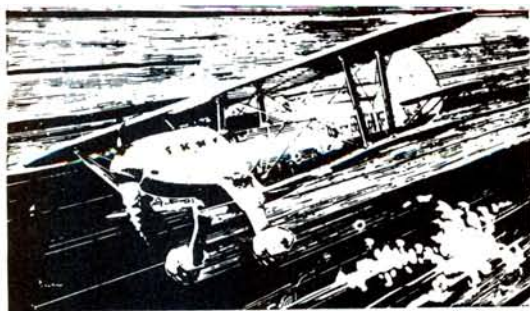


Tom Sewell's T-38 Talon in frame. Will probably be used for fiber glass plug.



Karl Hibbs (right) accepts General Dynamics' award from G.D. Test Pilot Phil Oestreicher while C.D. Ed Couch (left) looks on.



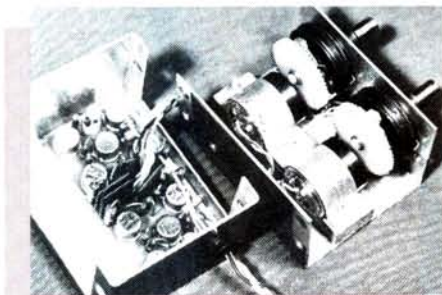


# Golden Age of

by HAL "PAPPY" deBOLT

**Y**OU MAY RECALL that I've said that the servo is the heart of the system and the motor is the heart of the servo. I mentioned the English Mighty Midget as the first motor widely used for propo, and then described the Swiss Micro-Mo as having more desirable characteristics for the more exotic propo servos.

In the last issue I showed a very interesting Graupner pic of the German Bellamatic servo, which may have been the first commercial Micro-Mo motor.



*An early dual feedback servo. Fabulous "Micro-Mo" motors used. It proved concept. Details in text.*

This was the ultimate development of the pulse-style servo with a modern-style output wheel lever. As you see, this servo's configuration would not look out of place today. The Bellamatic used a neutralizing coil spring which automatically returned the output to neutral. If you lost the RF signal the servo automatically neutralized, and this was considered a necessary safety feature. The motor's standard gearing was supplemented by an added gear segment which further reduced the speed driving the output. Final ratio was 180:1, which is common today. As with most pulse actuators, negative potential moved the output in one direction, and positive in the opposite direction. With equal potential it was in neutral. This version did have a mechanical; if a potential became too great the motor stalled.

The Bellamatic was an excellent example of early German R/C development and progress. Note the neat professional-style connector! Probably the widest American use of the Bellamatic was with Don

Brown's proportional systems which I'll describe sometime.

The Micro-Mo motor was also the solution which led to the forerunners of our modern servos—the so-called feedback designs. Several variations on the basic concept were developed for analog and, later, digital radios. If we understand the servo operation we'll see that different styles of radios can supply the operating potential.

Basically, a feedback servo operates when there is varied input voltage to it from the receiver. We can say that 0 voltage creates a neutral position. Positive drives it one way, negative the opposite; rather like a pulse servo, but a servo electronic circuit provides a *second* feedback voltage, independent of the input voltage. This feedback circuit includes a voltage control potentiometer which is operated by the output of the motor and gear train. There's also a sensor circuit into which both the input and feedback potentials are fed. The sensor circuit feeds the motor. When the sensor sees a difference in potential it runs the motor until the potential is cancelled. (This could be



*Can anyone identify Lewis Chambers' "UFO"? From the '50s, .049 power, 36-inch span.*

anywhere in the output's travel range.) Putting it simply: when your transmitter stick is in neutral the receiver feeds no voltage to the servo. In turn, the servo pot is adjusted to feed back no voltage. The result is servo neutral. If you move your stick a bit to the right, the receiver feeds *some* voltage to the servo and the output moves right. Simultaneously, the pot moves with the output wheel feeding back an increasing opposite voltage; when the input and feedback voltages cancel each other, the motor and servo outputs stop in the position commanded by the stick position. The sequence repeats



*The senior of O/Ters, Lewis Chambers with his champ, Taurus, and Cruiser.*



throughout the range of your stick, and this is basic feedback servo operation.

I must differentiate between analog and digital feedback servo operation. There were differences between them which created a distinct output for each. With analog there's a maximum voltage potential. As the receiver is fed a command, it will feed an escalating voltage (as the transmitter stick is moved) to the servo. Starting at 0 volts, and going to 1, 2, perhaps 3 volts, depending upon the final stick position which *could* be maximum



Forty-inch span, Cub .074-powered "Liberty Belle." Built and enjoyed by James Lankin of Birmingham, AL, from mag plans in 1954.

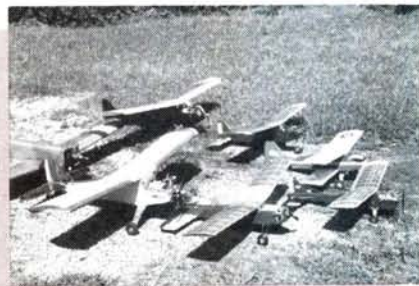
voltage. Thus, the output movement of the servo is distinctly *linear* in nature. Remember that the feedback voltage also escalates until it matches the input. Linear action is most desirable for aircraft control, but for small movements the servo motor doesn't get full voltage power with analog.

In practice, what happened was that a different amount of transmitter stick movement was required to obtain a desired model reaction, depending upon changes in model speed and/or the control air load. More load, more stick movement; less load, less movement to get an equal model reaction. The servo simply had less power around the neutral point. The action was something like today's exponential feature—and we think that's so new! Sounds bad? Not really. You simply flew the model, not the transmitter! While watching the model you moved the stick until you saw the desired reaction. Unless a pilot was particularly observant of the transmitter, he never realized what was happening. He flew well with analog!

Digital operation was, and is, really precise. For example: a pilot switching from analog to digital might think digital was more "touchy." The reason for this is that no matter how small the stick movement might be, the servo *always* has full power. Air loads don't have the same effect as when you're using analog.

With digital, we also fly the model, and not the transmitter, so the end result is the same, no matter what type of radio you have. An extreme version of the analog characteristic is shown by the German Stegmeir, a pneumatic system used at the first FAI Championships. With this, an increase in speed called for full stick movement even to have just a small control reaction!

With a digital system, the servo is supplied with full power voltage for increments of time, and this is what determines the amount of servo movement. We should talk in microseconds, but for ease of discussion let's use seconds. If a servo output travel was 1 inch, we could divide this into tenths. Then we could say that  $\frac{1}{10}$ -second of power would move the output one segment or  $\frac{1}{10}$  inch. Two-tenths of a second would provide

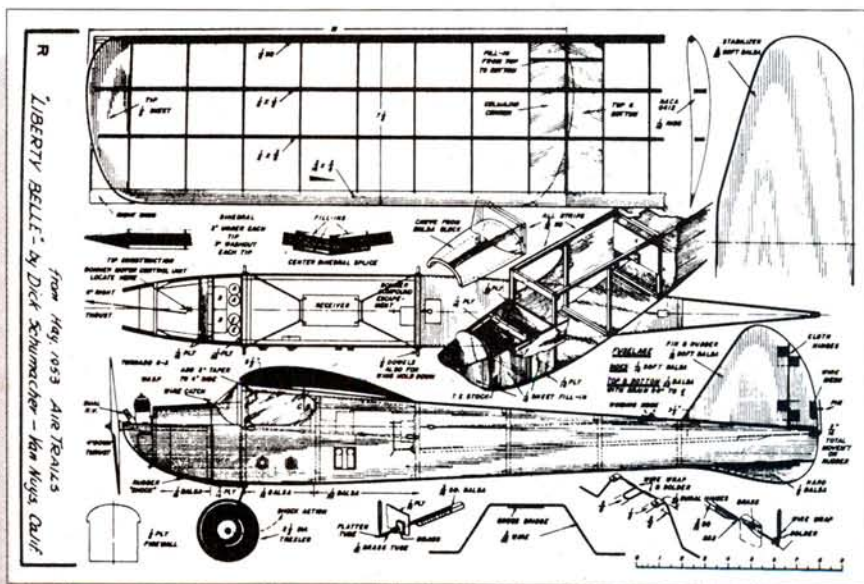


Lewis Chambers O/Ter R/C fleet. Built in the '50s, hard to imagine they all fly regularly. Details in text.

$\frac{2}{10}$ -inch movement, one full second equaling the full inch movement.

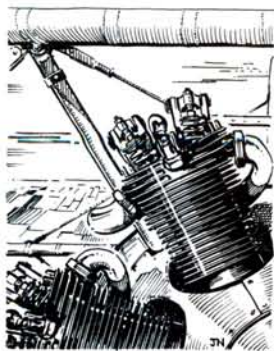
Visualize how the servo moves in segments. You should see that the receiver feeds full voltage for the time interval commanded. With full power, the servo moves solidly during any time period. In so doing, the feedback also increases to achieve a balance where all stops. Thus, a digital servo "steps" itself from one position to another. Actually, the coding is in microseconds and the total movement is about  $\frac{1}{2}$  inch in about  $\frac{1}{2}$  second. Today, there are 50 or more segments in the

(Continued on page 89)



Simplistic Schumacher "Liberty Belle." One of many "scratch-built" designs of the early '50s.





# Four-Cycle Forum

by CHRIS ABATE

## RETURNING BY POPULAR DEMAND!

**W**HEN ASKED IF I'D LIKE to write this column I was both excited and honored. Then I started wondering how I'd start. Do I mention that I've been building R/C models for twenty years, and that I've been flying 4-strokes in pylon competitions for the last four years? And how about the fact that I've been president of the Quarter-Scale Pylon Racing Association for the past two years? Should I say that I've flown 4-strokes in scale and non-scale aircraft (both large and small), and in both single- and multi-cylinder engines? Should I tell you that I enjoy doing research and reporting my findings?

I think I just introduced myself and my column! That wasn't too difficult. What can you expect to see and read about here?—technical information on 4-strokes; what's new in these power plants; the different areas in which they're being used; new support equipment and care of 4-strokes. Also, I've heard many modelers talk about (and sometimes complain about) why "they" don't describe and explain more about this or that aspect of our sport. This column is here to help you and keep you informed on the latest



*Larry Kauchek, president of Loctite A.C.G., about to start the race.*

products, techniques and events in the radio-control world.

As I've already mentioned, I've been flying 4-strokes in 1/4-scale pylon races organized by the Quarter-Scale Pylon Racing Association (Q.S.P.R.A.). This organization was spearheaded eight years

ago by Lyn Engdahl. Pylon racing was once a local event in the northern Ohio area. Since its inception it has gradually become a national sport and is steadily growing in popularity. The association is dedicated to reproducing full-scale, post-World War II Formula 1 pylon racing. Cleveland, OH, was the original home of this event which was first known as the Cleveland Air Races. As the years passed, this event became the Cleveland National Air Show, now held on Labor Day weekend on the shores of Lake Erie in Cleveland. In keeping with the spirit of past years, the Q.S.P.R.A. follows tradition and always holds its Nationals competition on this weekend.

On the last day of the air show the top four pilots battle for the top honor. This year, as for the past three years, the Loctite Corporation\* Automotive and



*Yours truly's aircraft, with best pit crew, my son Christopher! Aircraft is Ricky Rat.*

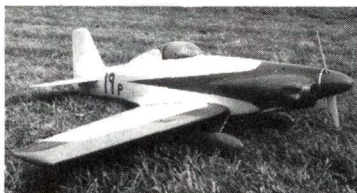


Consumer Group was the major sponsor of this event. Twenty-eight pilots battled on Saturday and Sunday at the Lorain County R/C Club, Lorain, Ohio. Tom Seaman and his group did an outstanding job of keeping events moving and on schedule. They did this difficult job in grand style.

After Monday's race, the top four were: Jim Prillaman, Memphis, TN, (1st place); last year's winner, Dave Wenman, Akron, OH, (2nd place); Gary Villard, Canton, OH, (3rd place). Gary had a fast time for the event, turning a 1 minute 57 seconds for 2½ miles. Dave Rigotti, of Chesterland, OH, took 4th place.

Before 4-stroke engines became the approved engine for this event, .60 2-stroke engines were used. These were adapted with special mufflers to keep down noise to a tolerable level. As noise reduction became a more critical subject, Lyn Engdahl once again initiated an improvement by introducing a 1.20 4-stroke engine at one of our races. Some thought him a little optimistic, but others were prepared to wait and see what would happen. Lyn's goal was a more controllable aircraft with a lot less noise, and his idea proved to be a winner.

As time went on more 1.20s showed up, and the rest is history. One just has to see their acceleration off the starting line, the speed, and the steady pull through the turns to appreciate why the 4-strokes can be a competitive engine in a 9-12 pound racing aircraft. Also, with a 2-stroke no



Top: Lewey Ray's (Arnold, MO) Rivets T-Tail, best-looking aircraft at the NATs.

Middle: Terry Barton's (Medina, OH) mean machine, Sweet Pea.

Bottom: Jerry Mong's (Medina, OH) Cosmic Wind.

one ever broke the 2-minute record or even came close. Remember what the fast time for this year was?—1 minute 57 seconds. Need I say more?

Here are some brief comments on ¼-scale pylon racing: There are kits and approved scratch designs available. Engines so far approved are the O.S.\* No. FS 1.20, Enya\* No. 1.20-4C, and Saito\* No. FA-1.20. Propellers are fixed-pitch, two-blade, wooden stock, 14x10 from D&W, World Engines\*, Top Flite\*, and Zinger\*. Aircraft weights range from a minimum of 9 pounds to a maximum of 12 pounds. Races are held on the AMA Formula 1 (.40 size) 2½ mile race course.

People say that the best proving ground is the race track, and the 1.20 4-strokes have certainly been racing well. If all of this sounds appealing to you, contact Quay Barber\* who is the Q.S.R.P.A.'s national district chairman and he'll send

you a packet containing information on membership, kits and rules, as well as general information on 4-stroke racing.

I hope you enjoy my first column as much as I enjoyed writing it for you. I'd like to hear from you now. What interests you about 4-strokes, and what problems are you having. I'd also love to hear about



Larry Kaucke, president of Loctite A.C.G., presenting 1st place award to Jim Prillaman, of Memphis, TN. Yours truly looking on.

other events using 4-strokes, and would welcome black and white photos of good-looking aircraft powered by 4-stroke engines. Please include aircraft specs, and one day (who knows?) you might see your pride and joy in print!

\*The following are the addresses pertinent to this article:

Loctite Corporation, 4450 Cranwood Ct, Cleveland, OH 44128.

OS; Distributed by: Great Planes Model Distribution, P.O. Box 4021, 1608 Interstate Drive, Champaign, IL 61820.

Enya Model Engines/Altech, P.O. Box 286, Fords, NJ 08863.

Saito; Distributed by: United Model Distributors, 301 Holbrook Dr., Wheeling, IL 60090.

World Engines, 8960 Rossash Ave., Cincinnati, OH 45236.

Top Flite Models, 2635 S. Washash Ave., Chicago, IL 60616.

Zinger; Distributed by: J&Z Products, 25029 S. Vermont Ave., Harbor City, CA 90710.

Quay Barber, 27106 Butternut Rd., North Olmstead, OH 44070. ■



Tom Jordan, Apple Creek, OH. Tom likes flying his Cosmic Wind close to the tree line. Nice landing job!



Left to Right: Dave Rigotti, 4th; Dave Wenman, 2nd; Jim Prillaman, 1st; Garry Villard, 3rd. Garry Villard also holding fast-time award.



## LIKEWISE

(Continued from page 15)

Pyrotechnic whiz, Matt Vogel, made up a number of attention-getters consisting of a mixture of gasoline, naphtha, and some magic juice along with a battery

pack and arming switch. We all watched him pack the area beneath the canopy of each Talon with this nifty little "Apocalypse Now" reject. Some of us watched through binoculars, but Matt sure knows his stuff, and soon twin high-energy

Talons were taxied to the arming area, pins pulled and launched!! I got the Eagle airborne and set up a pace lap. "Rolling!" barked David, indicating that filming had begun. On the pre-flight brief he had said that he would call "UP," signaling all three ships to go vertically, and "BLOW," the cue to detonate the charges in the Talons after collision. We were orbiting in position, "UP"... "BLOW!!" No collision, pretty good explosion though—scratch two Talons. We tried it again with nearly identical results, except Nick Jr. managed to skillfully land his bird relatively intact, but no longer usable for camera work.

Seems like, after the explosion, with two identical airplanes in the same chunk of sky, Nick the Elder took his eyes off his Talon which proceeded to auger itself in. Four down, four to go!

Then it was lunch time! Send out, get a truckload, no one should have to work hungry! An hour, maybe two, later, we'd all done our very best imitations of blunt-nosed, barnyard bacon sources and it was time to resume our aerial antics. Matt (remember him?) was getting serious. Bigger charges, more juice!! This one should be for the Gipper! Launch, orbit, on track, "UP"... "BLOW," and I mean

(Continued on page 60)

## Introducing PlugLock™

- .020 Stainless Steel Tubing Wall
- Stainless Steel Spring, wound exclusively for PlugLock™
- Hi-Temp Positioner will not melt when used as directed.
- Direct-connection Hi-Temp Teflon wiring. NO sliding contacts to corrode and cause unwanted resistance during charging and discharging.
- Positive 6-point locks will not strip or wear out like the old 3-point brass HeadLock.
- 1650 ma/hr, Fast-Charge capable, stainless steel construction battery provides 35% more starting power! No need to buy an expensive battery or carry a 'spare'!

NI-STARTER™  
Patent #D272901  
and #4,405,890  
PlugLock™  
(Patent Pending)

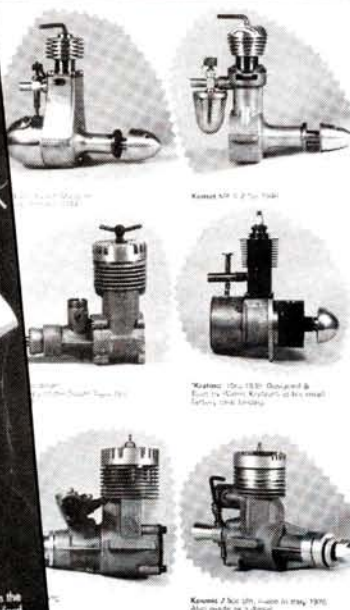
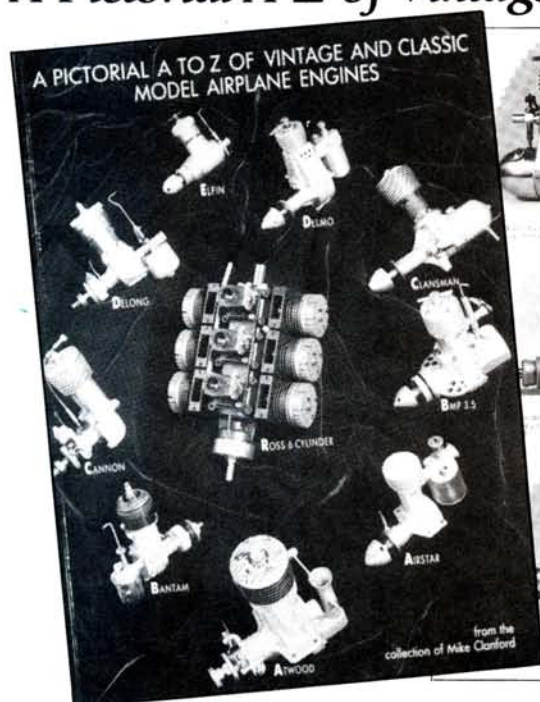
## McDaniel R/C Incorporated

12206 Guinevere Road  
Glenn Dale, MD 20769  
301/464-2260 Telex 287901 McD-UR



Made in U.S.A.

## A Pictorial A-Z of Vintage and Classic Model Aeroplane Engines



The only A to Z of vintage engines, from Ace to Zom, with over 1,000 beautiful photos collated from one of the largest independent collections of antique engines.

Available from:

**CLAN ENTERPRISES** 8-10 Cricket Green,  
Mitcham, Surrey, England for \$35, including air post,  
packing and insurance.

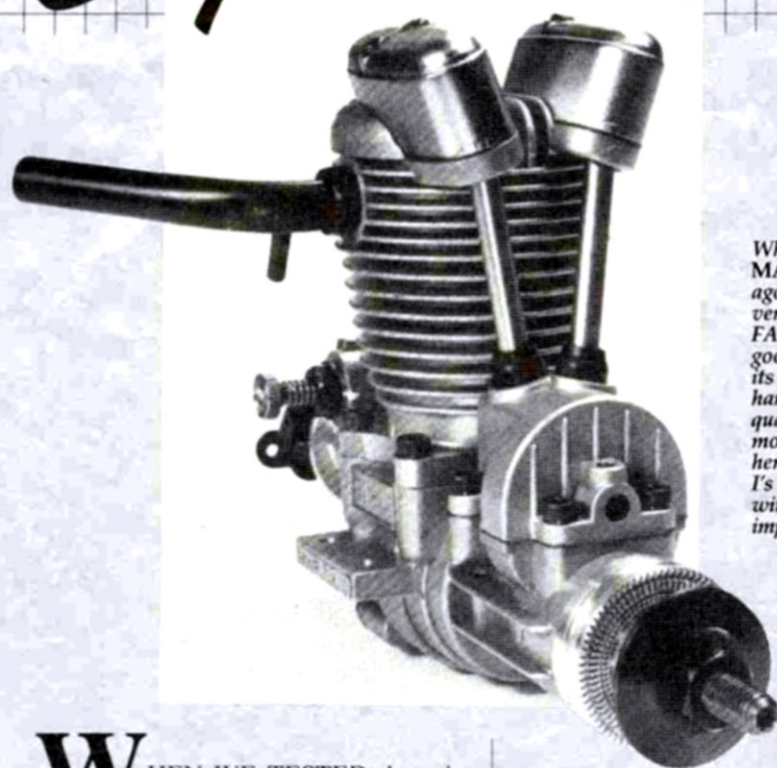






# Engine Review

by PETER CHINN



When tested for MAN five years ago, MK I version of Saito FA-45 earned good marks for its viceless handling qualities. MK II model shown here retains MK I's attributes with internal improvements.

## SPECIFICATIONS

Type: Air-cooled, single-cylinder, 4-stroke, with pushrod-operated overhead valves.  
Bore: 22.4mm (0.8819 in)  
Stroke: 19.0mm (0.7480 in)  
Displacement: 7.488cc (0.4569 cu in)  
Nominal Compression Ratio: 6.5:1 (approximate)  
Speed Control: Saito adjustable automatic mixture control carburetor.  
Checked Weight: 415 grams (14.6 oz)  
Mounting Dimensions:  
Crankcase width: 32mm  
Length (from prop driver face): 109mm  
Height above C/L: 85mm  
Bolt hole spacing: 46x15mm  
Manufacturer's Claimed Power Output: Not stated. (See text.)  
Manufacturer: Saito Seisakusho Ltd., Ichikawa-shi, Chiba Prefecture, Japan.  
U.S. Distributor: United Model Products, 301 Holbrook Dr., Wheeling, IL 60090.

**W**HEN WE TESTED the original Saito FA-45 and published the results in *Model Airplane News* a few years ago, it was the only .45-cubic-inch 4-stroke motor on the market. It differed from previous Saito engines in that it had more compact rocker gear enclosed in neat, twin-rocker boxes, as well as enclosed pushrods. This replaced the slightly ungainly looking, open overhead valve gear featured by Saito's first two 4-strokes (the FA-30 Mk.I and the FA-40 Mk.I).

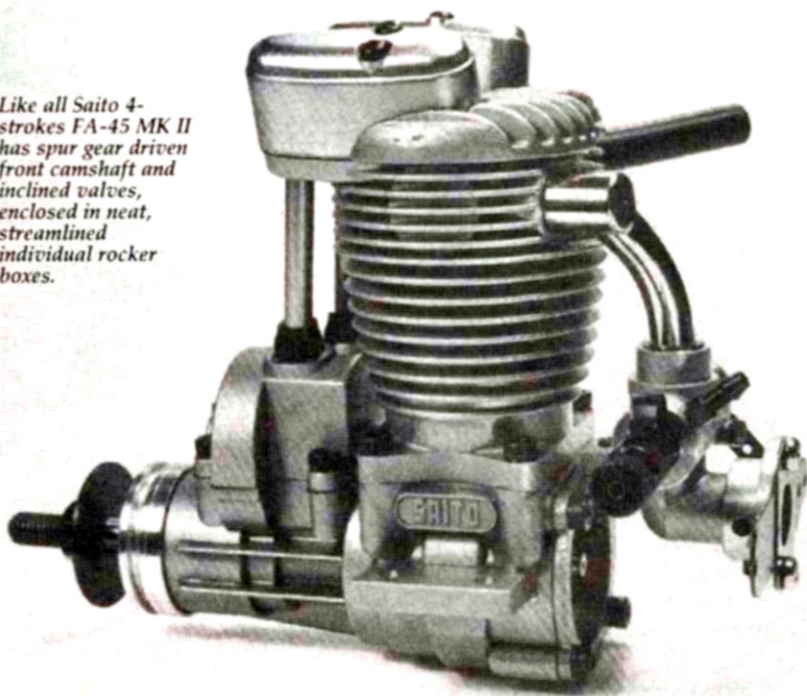
These refinements made the Saito FA-45 one of the most attractive-looking, small 4-cycle motors and, with its good performance and easy handling, it was well received by 4-cycle engine users. A new version of the FA-40 followed shortly thereafter, having similar enclosed rocker gear. Since then, all Saito 4-stroke engines, including the larger 3.2-cubic-inch 5-cylinder FA-325R5 radial, have been similarly equipped.

The FA-45 Mk.II, successor to the original FA-45, embodies various modifications, some of which are found in other current Saito engines. One of these modifications is the use of a cylinder with a non-detachable head. Some of the earliest commercial model engines, including the

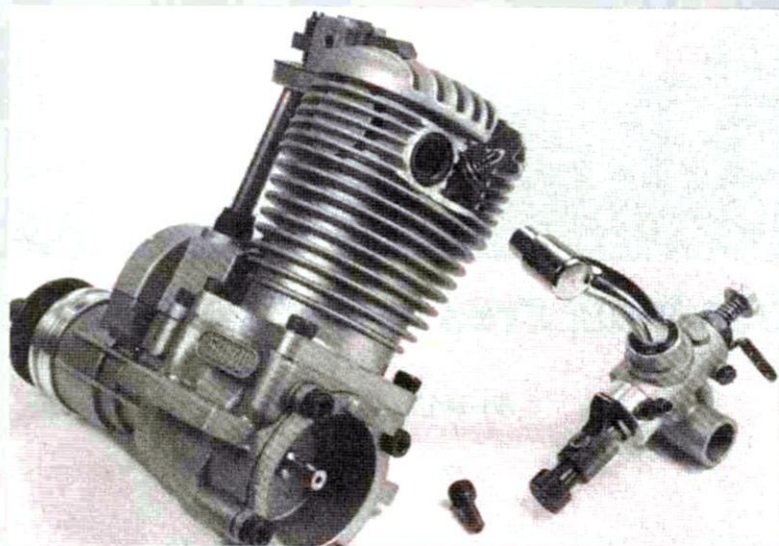
## SAITO FA-45 MKII

New Version Makes Good Even Better.

Like all Saito 4-strokes FA-45 MK II has spur gear driven front camshaft and inclined valves, enclosed in neat, streamlined individual rocker boxes.







*MK II's use of fixed cylinder head has permitted relocation of inlet port for straight gas flow to inlet valve. Choke valve removed from carburetor in this photo.*

pioneer Brown Junior, had this feature, as do several of the current chainsaw-engine-based 2-strokes. But, as far as current-model 4-strokes are concerned, this feature is almost exclusive to Saito.

Over the years, Saito model 4-strokes have all had certain features in common. For example, all have used spur-gear-driven cams at the front of the engine, immediately above (and parallel to) the crankshaft and driven directly from it, and all have had inclined valves. There has been less consistency regarding choice of material for the piston/cylinder assembly, and the factory certainly hasn't been slow to experiment with different arrangements.

For example, the very first Saito 4-stroke, the FA-30 Mk.I, had a ringless aluminum piston running in a chromed-bore brass cylinder liner (the classic ABC setup), with the cylinder block being an integral part of the one-piece body casting. For the FA-40 Mk.I that followed, the brass liner was discarded and the hard-chrome surface treatment was applied directly to the cast-aluminum cylinder block, which was now a separate part, flanged at the bottom and bolted to the crankcase. The separate cylinder casing exists in all other Saito 4-strokes, with a chromed brass sleeve and sometimes with a conventional steel sleeve, and in

Other, larger, Saito 4-strokes, including the FA-120, FA-120S, FA-270T Mk.II flat-twin and the FA-325R5 5-cylinder radial, have chromed-aluminum cylinders.

The advantages of discarding the steel cylinder sleeve and using an al-chrome or ABC setup are twofold. First, the thermal expansion of the piston and cylinder is more closely matched, lessening the risk of the piston seizing in the bore during a lean run and, second, better heat transfer to the cylinder fins is achieved than with a steel liner which can cause a gap to open up between its outer wall and faster-expanding surrounding aluminum. The disadvantages of the classic ringless-piston ABC or al-chrome arrangement, i.e., loss of compression due to scoring of the piston when operated under less than ideal working conditions, is overcome by



*In contrast to the FA-45 MK I, MK II has ringed piston and a completely new cylinder casting with an integral cylinder head.*

each case with a ringed-aluminum piston.

The Saito FA-45 Mk.II features a steel sleeve, but the production models now leaving the factory have a chromed brass sleeve, bringing them in line with the newest Mk.III version of the FA-40 and with the FA-65 and FA-80 models. That is to say, all these are now ringed ABC engines. When we featured the twin-cylinder FA-90T Mk.II in a 1984 Engine Review, it had a non-detachable head but used a steel cylinder liner, and has also been converted to a ringed-ABC-type.

the use of a piston ring. This also makes the matching of the piston to the cylinder less critical when manufacturing.

Reverting to the question of the FA-45 Mk.II's use of a non-detachable cylinder head, you may well ask, Why? Apart from the obvious answer—i.e., no head joint and therefore no risk of gas leakage (not a common problem with model engines anyway)—the main advantage of the integral head is that, with no retaining screws or studs passing through

*(Continued on page 95)*





**CLOSE YOUR EYES AND IT'S A P-26!**

COVERITE

by DAN SANTICH

# PEASHOOTER

**T**HE PEASHOOTER is the latest in a long line of excellent kits manufactured by Coverite\*. It isn't a scale model, so don't confuse it with the P-26 by Boeing which was used by the Army Air Corps up to World War II. The only resemblance to the Boeing Peashooter is the color scheme.

Coverite has aptly described this first in a new series of kits as "Sorta Scale," which probably means that it's up to you what you want to call it. This is a great idea. This kit could very easily be made to look like any number of airplanes such as the Mustang,

Thunderbolt, Zero, or countless others. Only *your* imagination and inspiration will determine what it is to be.

**THE KIT:** This kit is primarily balsa with formed plastic top pieces, wheel pants and cowl. There's nothing exotic or difficult about the construction as long as you read the plans and follow the instructions which are given in a fully illustrated booklet. Also included in the kit are a beautiful set of adhesive markings, formed wire landing gear, and assorted hardware. To my knowledge this is the only kit that offers a miniature pilot—the Black Baron, of course!

**CONSTRUCTION:** Henry Haffke designed this model, and it appeared first in a construction article in the August 1987 issue of *MAN*. For more information about it, or if you have any questions regarding the assembly, you may want to refer to that issue.





## SPECIFICATIONS

**Wingspan:** 56 inches  
**Wing area:** 560 square inches  
**Weight:** 5 pounds

**Engine:** .40 2-cycle  
.46 4-cycle

Assembly begins with the tail surfaces which are pre-formed from 1/4-inch balsa. Once that's done, assemble the wing. The ribs are die cut and easily removed from their sheet of balsa. Since they're all the same, assembly goes quickly as you space the ribs on top of the lower spar and forward sheeting. Build two wing panels, then join them and complete the center section sheeting and aileron servo mounts. This isn't difficult and is well defined in the instructions.

The fuselage assembly is just as easy. The engine firewall is of 1/4-inch ply and machine-sanded to exact shape. Glue it and two other bulkheads in place on one fuselage side, and then position the opposite side and glue it in place. With the addition of a few stringers, your fuselage is nearly complete. All that remains are the top pieces, which are already formed. Cut them to a final fit and glue them on with cyanoacrylate.

The only change I made was to make my top hatch permanent instead of removable as shown on the plans. Just remember that if you do this you *must* install your fuel tank first.

**COVERING AND FINAL TRIM:** For two reasons, I selected Coverite's Black Baron Film to cover this model. First, it has the best color density, particularly the yellow. With Black Baron Film you need not worry about the balsa structure showing through the covering. Second, with the proper heat application it sticks well to nearly anything. I covered all the plastic pieces, including the cowl and fuselage decks. I painted only the wheel pants, for which I used Black Baron spray paint.

**FINAL ASSEMBLY:** I always cover everything before I add the control surfaces. Once that's done, I add the final trim, install the radio, pushrods, landing gear, engine, and tailwheel. I used the HB40 Blitz for power and it was more than adequate.

**FLYING:** Since the Coverite Peashooter has a semi-symmetrical airfoil I had my doubts about its performance. However, these were soon forgotten. The model is very easy to fly, yet has good



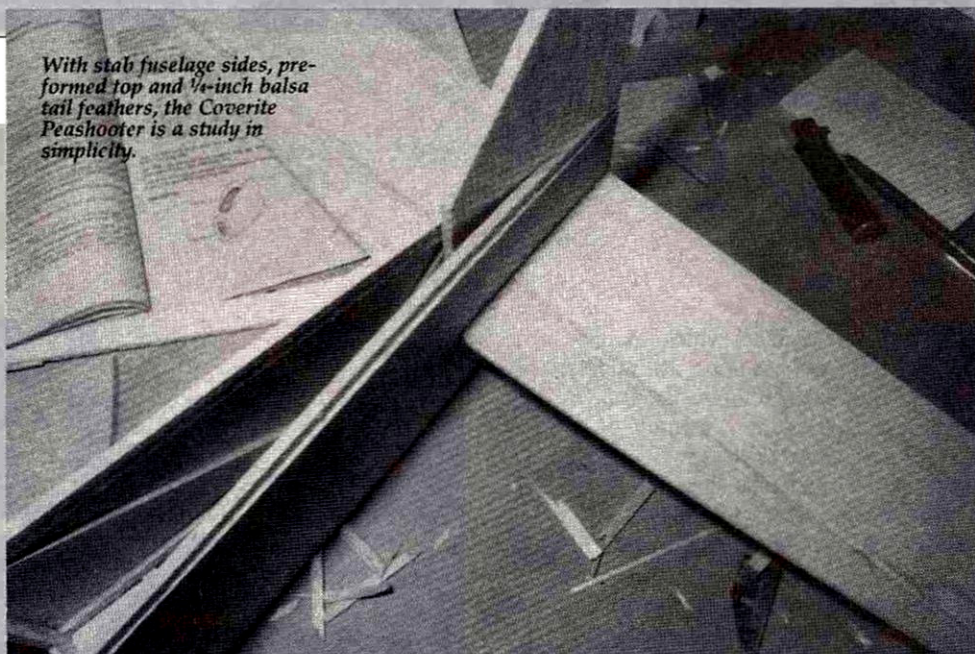
*The Perry-ported HB .40 Blitz has good power and excellent idle.*

aerobatic qualities. It even has merit as a trainer. My sons, who'd never before flown an R/C model, had very few difficulties handling it. Certainly, they had problems with orientation, just as you'd expect with any beginners, but the Coverite Peashooter responded so well that they could

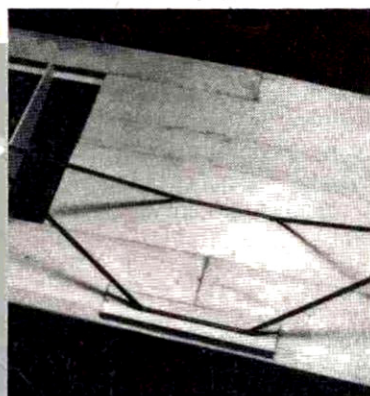




*With stab fuselage sides, pre-formed top and 1/4-inch balsa tail feathers, the Coverite Peashooter is a study in simplicity.*



*Front landing gear wire keys into a hardwood mount that also supplies center-section strength.*



*Only the center section of the constant-chord wing is fully sheeted—keeps things light!*

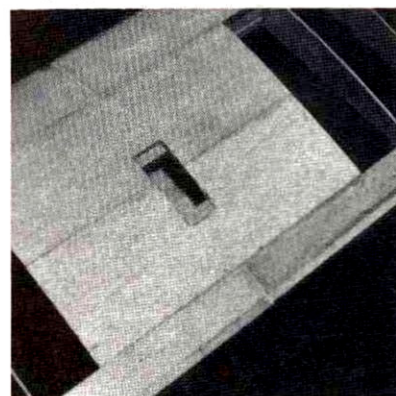


figure out what it was doing and make the necessary corrections without much help from me. I also let a few of the other modelers at the field fly it (that's how I got the pictures!) and they all seemed impressed with its handling qualities.

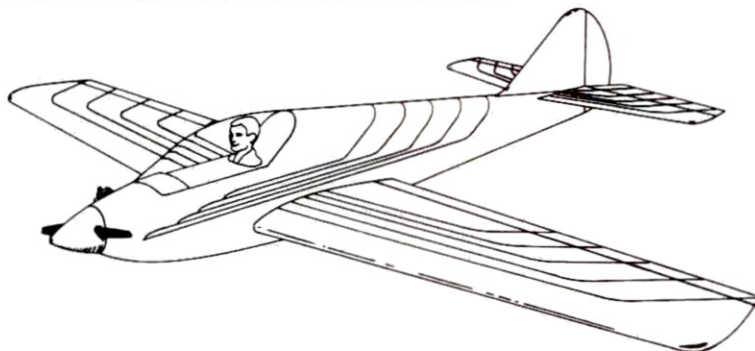
In summary, the Coverite Peashooter may never win you a trophy at the Scalemasters, but who really cares? Your reward will come from the hours of enjoyment you'll have just flying and having fun.

*\*The following is the address of the manufacturer featured in this article:*

*Coverite, 420 Babylon Rd., Horsham, PA 19044.*

## **“RAINBOW RUNNER: PURE PERFORMANCE”**

The Rainbow Runner delivers total pattern performance in .25 and .45 sizes. Designed with all the features of a pattern champion, the Rainbow Runner is ready to meet and exceed all your expectations.



**Gm** PRECISION  
PRODUCTS INC. (714) 592-5144  
510 E. Arrow Highway, San Dimas, CA 91773



# Get the best **FINISH** with **BADGER**



Custom Painting  
by Phil Sroka

Badger offers you air-brushes for every price and skill level. Geared for the beginner, the Model 350 brush is easy to operate and maintain.

Whether you are a beginner or a pro, no other brush is as simple to operate as the Model 200, yet produces the same spray pattern as the professional Model 150.

Experienced air-brushers will like the versatility of the Model 150 air-brush. It allows you to change width of line and opaqueness of paint without stopping your hand movement.

All 3 brushes will spray modeling paints, automotive enamels and lacquers, properly reduced artists acrylics, as well as Badger's own Air-Opaque air-brush colors. At finer hobby and craft stores.

For more information, send \$1.00 to Dept. MAPN88



©BACo. 1988



**BADGER AIR-BRUSH CO.** 9128 W. BELMONT AVE. FRANKLIN PARK, IL 60131

Dist. in Canada by: HOBBY INDUSTRIES, 24 Ronson Drive, Rexdale, Ontario M9W 1B4

## LIKEWISE

(Continued from page 52)

"BLOW"!!! Wahoo! Success! Bellissimo! Ausgezeichnet! What? What? The cameras weren't WHAT!

Boy, we'd exhausted 75 per cent of our air force and weren't sure of what we've got! An air of frustration settled over everyone, so we got the two surviving Talons airborne and did the drill again. Looked pretty good from where I stood. The cameras were rolling, Davidson got it on video and the sun started to set in the west. Recapping this day of carnage we found we had lots of Talon wings, practically no fuselages, eight Como .40 engines, many charred radios, plus we were out of food. All sufficient reasons for calling it a wrap. Oh yeah, my lone Indy Eagle sat smugly in the pit and, if one looked closely, a triumphant smile could be detected across its cowl.

I don't know how much, if any, of our cinematic adventure will make it to the silver screen. If none of it does, it's really OK, since we had a ball doing it. If *any* of it does, we'd like to thank Elliot Kastner, our producer; Ooty Moorehead, our production manager; David Kappes, our co-producer; and so many other people who made the impossible dream come true...and we really can't forget all those behind-the-scenes people without whose dedication this entire effort would not have been possible...and all the little people...and all the big people and...

*\*The following is the address of the company mentioned in this article:*

Indy R/C Sales, 10620 N. College Ave., Indianapolis, IN 46280.

## FLOATING

(Continued from page 42)

to their pond. While I sat in the gravel picking burrs off my socks, Roger demonstrated the S.T.O.L. capabilities of Unionville's 8-foot de Havilland Otter. This particular kit comes with an option to install full-span fore flaps in addition to conventional flaps and flaperons. Going about 15mph, Roger put the Otter down three times within a foot of the beginning of the runway! As they say in the Unionville brochure: "A 13-pound aircraft descending like a parachute with 30 degree down-nose is a sight to remember." Too bad it wasn't on floats.

So that's the end of my Beaver saga or "What I did last summer." Contact the people at the end of this article for prices and availability. I think you'll like Unionville's products. They have planes for the

(Continued on page 75)



# X-CELL 60



## HELICOPTER

by  
DAVID TROST

**W**ALT SCHOONARD and his company, Miniature Aircraft USA\*, are well known to anyone who has even a remote interest in radio-control helicopters. For many years Walt was the importer for the popular Schluter line of helicopters as well as many other well-known imports.

Over the years Walt came to know each of the machine's strengths and weaknesses, and he used this knowledge to design a helicopter of his own. The X-Cell 50 and 60 are the results of two years of designing and testing.

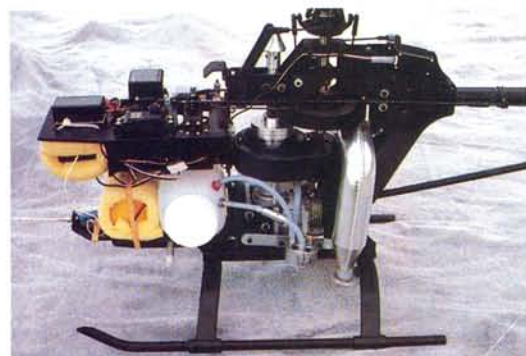
The X-Cell 50 and 60 machines are very similar, the main differences being the length of the tail boom and the rotor blades. The X-Cell 50 has bushings on the control bellcranks while the X-Cell 60 has a ball or thrust bearing on almost every moving part; 46 in all.

Most of the major components in the main and tail rotors, with the exception of the main rotor blades, the tail rotor hub and the axles, are molded of an extremely tough fiber-filled composite. There are two ball bearings and a thrust bearing on each main blade holder, and a single ball bearing and a thrust bearing on each tail rotor blade holder.

The main chassis is of relatively conventional design. It's neat, functional and strong. The machine



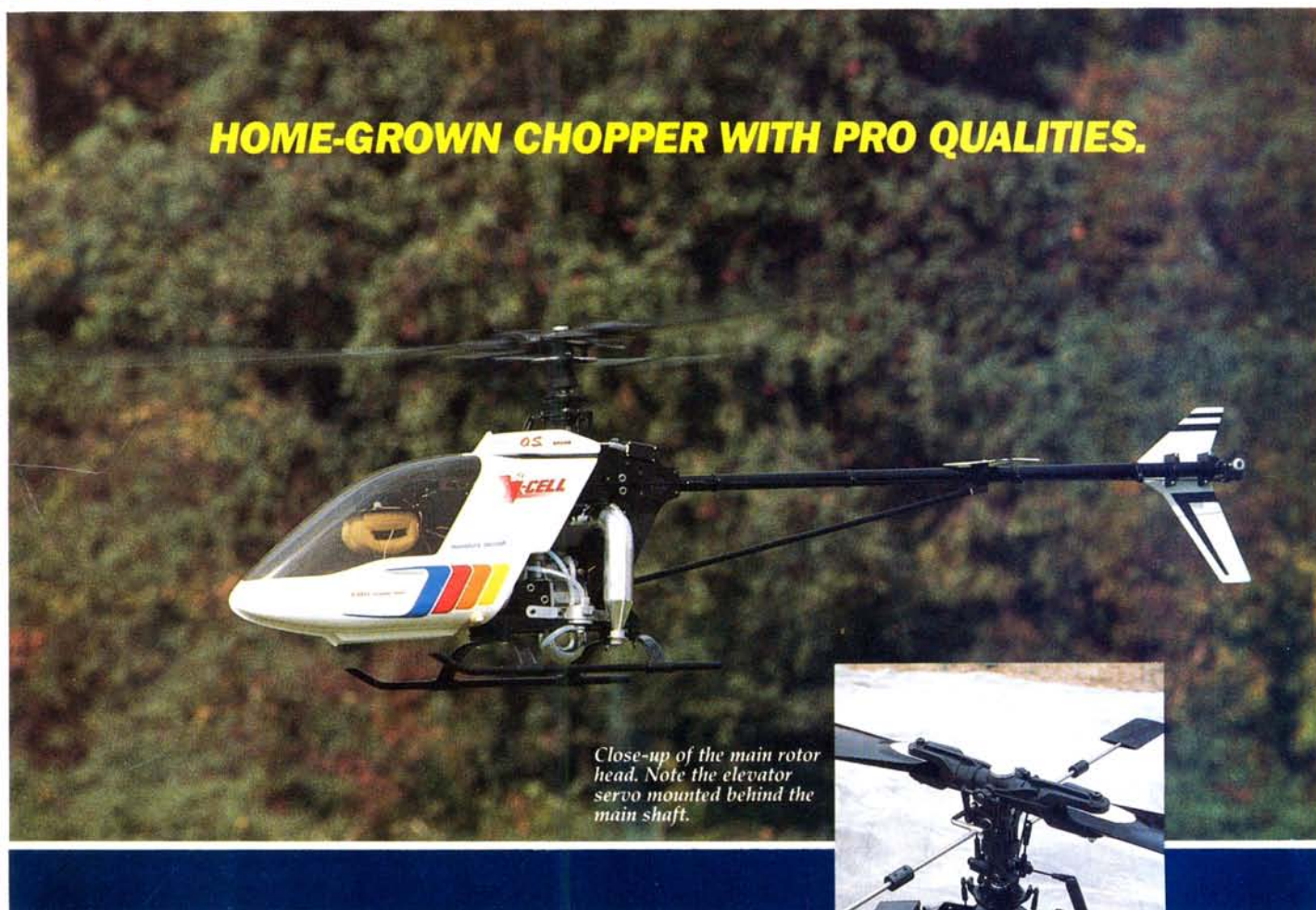
Close-up of the tail rotor showing the molded reflex blades.



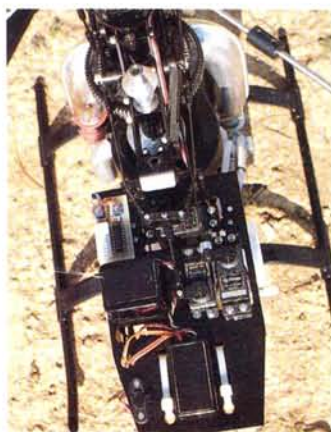
The left side of the machine. The remote fuel pump is seen mounted just in front of the Magna-Pipe.



## HOME-GROWN CHOPPER WITH PRO QUALITIES.



Close-up of the main rotor head. Note the elevator servo mounted behind the main shaft.



The radio tray showing the rocking servo mechanism. The Planesaver is at the lower left side of the tray.

sports Tuf-Strut II landing gear which consists of fiber-filled composite struts with aluminum skids.

The radio tray is made of machined 3mm plywood. The servo holes are also machined, so very little drilling or cutting is required when assembling the radio tray. When complete, it forms a solid mounting platform for the servos, receiver and gyro.

The machine uses a rocking servo and a sliding swashplate for col-

lective control. The aileron servo is hinged and connected to the collective servo. When the collective servo is moved, the pivoting aileron servo moves both roll pushrods in the same direction, so raising or lowering the swashplate. The rocking hinge and the control

linkages are simple, effective and play-free.

A unique feature of this machine are "Hexballs." These are steel balls with a threaded mounting stud and a 1.5mm recessed hex-head. The Hexballs merely screw into the plastic parts, self-tapping their own threads. The provided custom plastic links snap onto the Hexballs to form a smoothly operating, slop-free connection.

**CONSTRUCTION:** The X-Cell package contains photos of the completed machine shown both statically and in various flight attitudes. The components are well packed with the more easily damaged pieces, such as the canopy and the blades, protected by foam and separated from the metal parts by a cardboard tray.

Most of the parts are individually bagged in well organized, numbered subassemblies. All the parts needed for a particular step are bagged together,

(Continued on page 106)



UNITED  
MODEL  
PRODUCTS

*Field & Bench Review*

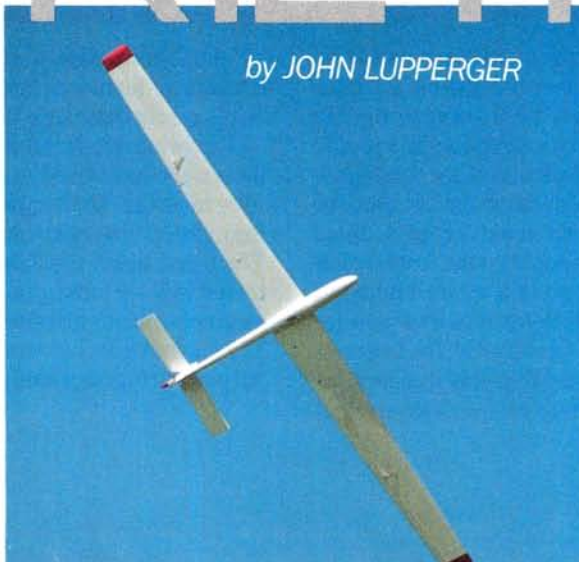


DURAFLEX + OBECHI = WHITE LIGHTNIN'

S U P E R

RIETI

by JOHN LUPPERGER



EVERY ONCE IN A while a project comes along that turns out to be something special. The "something special" about the United Model Products\* Super Rieti is its high degree of prefabrication and very innovative linkages and hardware. It's obvious that the people at Aviomodelli in Italy did their homework long before the first piece of foam or wood was cut. Like many European kits, the Rieti has obechi pre-sheathed foam wings and stabs. Obechi is about five times stronger than balsa and only slightly heavier. This means that a foam wing sheathed with obechi doesn't need a full-length spar, as would be necessary with a balsa-sheathed wing. So, although obechi is a little heavier, the wing construction is simplified. The kit also comes with a

pre-shaped balsa rudder, all the necessary stick balsa, a rigid molded plastic canopy, a nearly unbreakable Duraflex fuselage, and a super, complete hardware package.

The Rieti was designed for thermal or slope flying, at a very high performance level. The kit has provision for wing ballast tubes for F3B-style flying. However, the rigors of present-day F3B flying would probably be beyond the capabilities of the Rieti. I'm not saying that the Rieti isn't a high-performance sailplane. On the contrary, it will blow away any polyhedral floater! The wing is strong enough for a pretty good zoom. As a matter of fact, at most thermal contests there won't be too many ships getting a higher launch.

The Rieti incorporates full-





*The Super Rieti is a sleek, purposeful bird with a degree of prefabrication that will get the flier on the tow quickly.*

house control via rudder, aileron, elevator, and trailing edge dive brakes. This extra level of control makes the Rieti a real threat at any thermal event, especially when the conditions are less than ideal. The ailerons and dive brakes make landings precise, even in high wind situations.

**CONSTRUCTION:** The first line of the instructions advises you to study the plan carefully. This is good advice. Although there's nothing about the Rieti that's too difficult for experienced modelers, there are some areas in the instructions that could be a little clearer. To give this review validity, the instructions were followed to the letter.

The Duraflex fuselage is the first to be tackled. This somewhat unusual material is quite strong, and only a little heavier than a fiber glass fuselage would be. When grinding or drilling this material there's an odor which is like the smell of ABS plastic. However, the big difference is that Duraflex is much stronger than any plastic I've ever seen before. The forward section of the fuselage is stiffened by the servo tray. This has to be cut out of a piece of 1/4-inch printed plywood, which is about 16 plies thick. Believe me, you're not going to crumple up the front end of *this* fuselage! The slot for the stab pivot is molded outward on the fuselage vertical fin, and when you trim it off you get a perfect cutout, with a perfect arc. Nice touch! The bearings for the main stab wire are nylon and fit nicely into molded recesses in the fin. The wing mounts to the fuselage on metal

blades instead of on the wing wires that are commonly found in American kits. These blades are held in the fuselage by two split nylon bushings that go through the fuselage and are captured by two tapered bushings. These are both drawn up by two screws which securely hold the wing blades in place. Next, the ingenious aileron/dive brake motion transfer hardware is mounted to the servo tray. This is then glued into the fuselage with epoxy which sticks extremely well to the Duraflex. This piece of hardware is a type of bellcrank which not only changes the motion of the

aileron servo 90 degrees, but also lowers the hookup for the ailerons about 3/4-inch to line up with the aileron pushrods in the wing roots. It also has a rocker system that allows both dive brake pushrods to be driven

by one servo with a single pushrod hook-up. Another convenient feature of this system is that all of the servos are easily reached through the canopy opening of the fuselage.

The wing blade retainer boxes are made up of three pieces: the hardwood root spar, a nylon channel and balsa filler material. The hardwood spars are channeled to accept the nylon C channel which forms a box for the wing blades. The nylon insert runs about 5 inches in each spar and the remaining 14 inches is filled with balsa. It's a very neat assembly, but it's also the only area where I ran into trouble. The joiner blades just wouldn't fit into the finished assembly. All parts fit together well before being joined, but after being

*(Continued on page 113)*

**"THE RIETI... WILL BLOW AWAY  
ANY POLYHEDRAL FLOATER."**



Scalloped aileron trailing edge is evident in this fly-by.



ANOTHER OF THE  
GENRE, THIS ONE  
SUITABLE FOR  
SMALLER FIELDS.

## Field & Bench Review



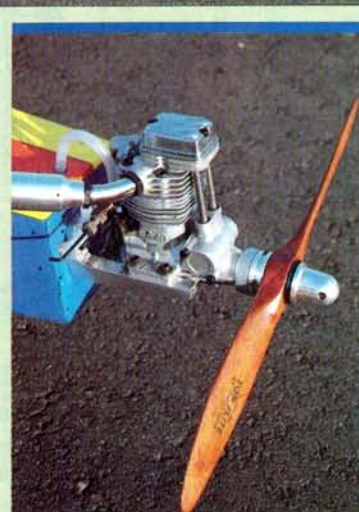
A time-proven basic design, the Stik series was the trainer for lots of us... still is!

by JOE MAKOVICH  
photos by RICH URAVITCH

# BIG STIK 20

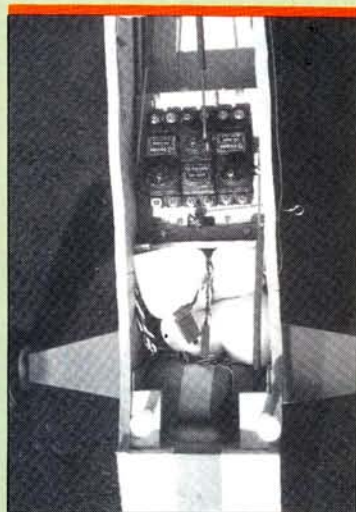
**T**HE OPPORTUNITY to do a "Field and Bench" article for *MAN* gives me a chance not only to build a fine model, but also to reminisce about the evolution of model airplane kits. The Great Planes® Big Stik 20 is an example of the current state of the art. The kit is carefully packed, and includes all the balsa and ply die-cut parts, dural nose gear, hardware in plastic bags, large plans and, of all things, an instruction book!

In the old days when all we knew about was earth, wind, fire and water, kits were much more primitive and scratch-building was popular. Kits came in flimsy boxes and contained just the bare necessities: wood, wire, bamboo paper and a plan. I suppose it's progress, but having an instruction book sometimes gives me the



The O.S. 40 Surpass 4-stroke is really too much power but great for "hot dogging."





The radio compartment provides adequate room for three-abreast servo installation.

feeling I'm painting by number and have no freedom to improvise.

The ancestor of the Big Stik, Das Ugly Stik, was a Phil Kraft .60 design which could be built quickly and was used to test radio equipment. It had simple slap sides, a semi-symmetrical rib flat wing, and strip ailerons with solid stab and elevator. **CONSTRUCTION:** The Big Stik 20 has evolved into a more elaborate kit, which

low idle. After running a 4-cycle I always take out the glow plug and put 8 to 10 drops of Marvel Mystery Oil in the cylinder and hold the engine nose-down. This prevents rust which can cause bearing failure.

The Stik 20 is covered with two films: Coverite\* Black Baron blue and yellow, and orange Super MonoKote\*. I've heard it said that the difference between a "so-so" modeler and a great modeler is sandpaper! Sand the model with a 220 grit paper prior to covering, and then vacuum the whole structure. Dust on the balsa is disastrous for adhesive coverings. Use a pin block to punch holes in the fuselage sides so that you can ensure a bubble-free covering over the sheet balsa. The model is easy to cover except for the scalloped trailing edges of the elevator and ailerons. These contours were a problem. The Stik is supposed to resemble a World War I Eindecker whose wing trailing edges were made of wire covered with linen fabric. When the fabric was doped, the

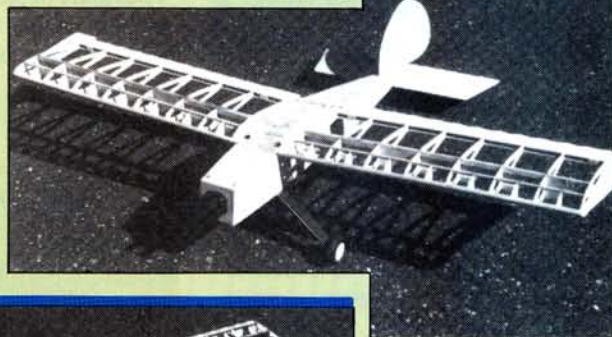
(Continued on page 75)

is to say that perhaps the kit is just a little bit over-engineered for an old guy but is a great kit for newcomers to the hobby. Completely assemble the fuselage before doing the final gluing to ensure that everything is properly aligned and that you've made no construction errors. With 1/8-inch ply lock plates glued to the shaped balsa fuselage sides, the positioning of the bulkheads is foolproof. The wing ribs are punched out to save weight, and all parts are cut and grooved so that correct assembly is easy. Unlike the Ugly Stik, the Big Stik has 1 1/2-inch dihedral under each tip, and this ensures more stability than a flat wing. The center section is reinforced with 3-inch fiber glass tape. I found that by spraying the center section with 3M Super 77 contact spray adhesive, I could position the fiber glass cloth before coating it with resin. I tried PIC\* coating resin and found it easy to use. It produces a finish that needs only a little scraping and sanding before covering.

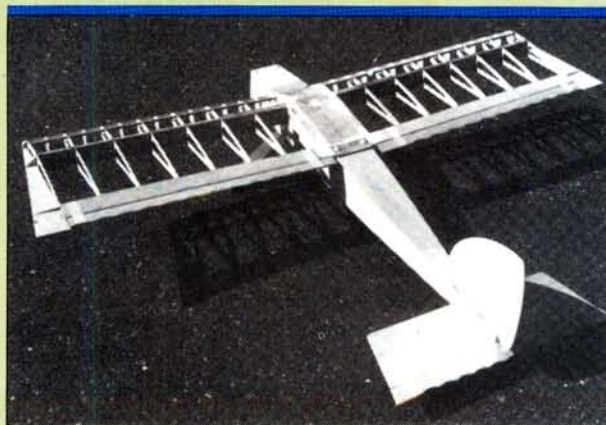
The stab and rudder are solid 3/16-inch balsa and are simple to build and hinge. Although a motor mount suitable for a .20 to .25 engine is provided, MAN provided a new O.S. .40 Surpass 4-cycle engine, so I used a metal mount as the nylon mount was too small. The Surpass 40 is the latest design and is more powerful than my old O.S. .40. One big improvement is a horizontal choke rod that you push in to choke; there's a spring to open it when released. I bench-ran four 8-ounce tankfuls through the engine; it seemed to break in quickly and held a good



Basic Stik design remains virtually unchanged. This view is classic. Plenty of rudder.



Two skeletal views clearly show "designed-in" performance features like lightened ribs. Airplane has excellent proportions.







# Giant Steps

by DICK PHILLIPS

**M**ODEL AIRPLANE building is a many-faceted hobby. You can start with a blank sheet of paper and design your own creation, as many do. You can go to the hobby shop, buy a kit for your next model and start building that same evening. Somewhere between these alternatives lies the possibility of buying a plan and using it to build your model.

I've talked about building from plans in the past, and this isn't meant to be an instructional piece for the plans builder. There are plans for almost every type of airplane you'd like to tackle. I have a



*Impressive 1/4-scale Bearcat by Jim Greenley. Monster uses 5.2 Sachs-Dolmar. Functional Exhaust outlet. Photo from Crash Evanson.*

collection of over 200 plans, ranging from pre-World War I planes right up to contemporary airplanes.

With such a wide array of available plans, there's something for every aspiring builder. While the cost of large kits is certainly a consideration, the work involved in making patterns and cutting the many parts accurately obviously looms large in the minds of those making a choice between buying a kit or building from a plan. Another consideration is that there are many plans for which kits are not available. Those who want something that isn't seen at every flying field in the country are candidates for plans building, just because they want something a little different to fly.

VIP Publishers in Colorado has just released its newest book. It contains reviews of 50 of the giant-scale plans



*Mint condition P-40 discovered by author. Airplane has fewer than 500 hours Total Time. More in text.*

currently on the market, and is complete with representative pictures of the birds, a guide to documentation sources and a guide to sources of the bits and pieces we need to complete such models. I wrote the book with co-author, Col. John A. de Vries and I'm pleased to be able to offer it to those of you who want to build from plans. Having bought many plans over



*1/4-scale Balsa USA J-3 by Reg Shorry shot at Red Barons, CA, Waterfly. Dan Parsons photo.*

the years, I know what a disappointment some of them are when first unrolled. I hope that Jack and I have provided a means of finding a plan suited to the skill level of every modeler interested in giant-scale building from plans.

A major advantage of writing a column like this one is being able to make a very wide circle of like-minded acquaintances. I've been writing columns for almost ten years and have made many friends. I'm gratified to receive pictures every month

from modelers all over the world.

While I'd like to be able to attend all the rallies and fly-ins held every year, I can't go to them all. However, through my circle of friends and their photos, I do see some aspects of these events. I share some of them with you this month.

I first met Merritt Zimmerman in Toledo a few years ago, and then again in 1986 at the IMAA Festival in Lansing, Michigan. Merritt was building a DeHavilland Moth at the time and promised to send some photos of it when it was completed. Those photos arrived recently and I thought you'd like to see a few of them.

The idea behind a scale model is to duplicate, in every way possible, the original airplane. I think Merritt has come as close to that ideal as is humanly possible. That's not a dummy engine



*Deweyville modified-to-biplane configuration. Built by Max McCurdy, Sacramento, CA. Dan Parsons photo.*



hiding a model engine in that cowl. The engine, like the airplane, is a working model of the engine which powered the original airplane!

The model speaks volumes on the kind of skills that Merritt has used to create this museum-quality model. Study the photos; I'm sure you'll agree with my assessment.

Jim Greenley is a member of IMAA Chapter 46 and is, according to his club mates, a master woodworker. The model shown is a 1/4-scale Bearcat, presumably made from his original drawings as I don't know of anything in the Bearcat line larger than Nick Zirol's 1/5-scale plan. The airplane will use a Sachs-Dolmer 5.2 in the engine room. That cowl is 15 inches in diameter and was crafted by the builder. The exhaust ducting is scale, and exactly as it was in the original. While not for the average balsa basher, such models are very popular wherever they appear, and are show-stoppers whenever they are flown.

Another good friend is Dan Parsons, of Albuquerque, New Mexico. Dan has shared his experience and photos with me over the years. He travels a lot, attends many rallies and scale contests, and has shared many of his trips with me by sending pictures. To those of my friends who've shared their experiences and their photos with me, my sincere thanks. Festivals and rallies are social occasions and more. The chance to talk to other modelers, exchange ideas, and discuss building techniques is an important part of such meets. A model builder who goes with an

open mind and an alert eye will benefit from mingling with others there. I always hear good ideas for my column, and wish I could attend more often.

There's a chance that the EAA's ideas may well be incorporated into the format of some of the events scheduled for 1988. The EAA sponsors a number of seminars at their gathering in Oshkosh each year. These seminars are aimed at the homebuilder or prospective homebuilder and are designed to teach him many of the things he'll need to know in order to build his own airplane.

There are workshops conducted by well-known and experienced homebuilders, each teaching his specialty to those who attend. All types of construction are usually discussed, giving newcomers the opportunity to get the straight dope on areas in which they may feel they are lacking.

This great idea has been adopted by Byron Originals at their meet in Ida Grove, IA, and has been quite successful. IMAA has also discussed the idea, and we hope that they'll carry it forward and

construction, in fiber glass work, basic construction, radio installation, engine mounting, detailing, finishing and painting, trim flying, and even basic plan design would add considerably to both the attraction and the value of attending such an event.

If you have an opinion on holding such seminar workshops at events like the IMAA Festival, drop me a line or let your IMAA district director know how you feel. With these opportunities available at such events, they could become much, much more than social occasions, or a chance to do some flying in front of a crowd, or the opportunity just to stand around and watch someone else fly.



*That engine is real and it actually runs! Model is perfect in every detail. Note prop hub, exposed rocker arms, and valve gear atop engine.*



*Merritt Zimmerman's impeccable D.H. Gypsy Moth. Just walk over, get in, and fly away!*

provide such seminars at their annual festival. (Wheeling, WV, seems to have the nod for 1988.)

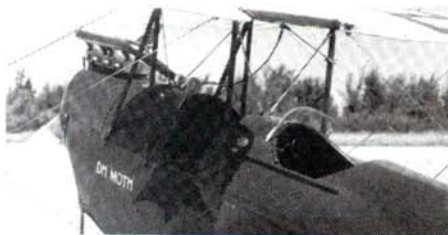
The specialists I've spoken to about such workshops at IMAA festivals are willing to contribute their time and expertise. There are no definite commitments but the idea has considerable promise. I know I'd be willing to participate, and I'm sure that others would too. The availability of someone specializing in foam

Think about it!

As an aviation historian I was intrigued by stories I'd heard about an airplane stored within a few blocks of my house. It had been described to me as a P-51, a P-40, a Spitfire and a couple of other things. Finally, my curiosity got the better of me and I had to hunt it down to set the rumors to rest. It turned out to be a P-40, as you can see by the photos.

This airplane has been owned and cared for by one man for the past 41 years. It has about 500 hours on the airframe, about 15 hours on the engine and propeller, and the owner has a second, zero-time engine for it in storage. It cost the owner (are you ready for this?) \$50, when he bought it in 1946!

That's my space used up for this month. See you next time.



*Cockpit detail of Zimmerman Moth. Note prototypical external instruments on cowl. Only giveaway that this is a model is the switch between cockpits.*

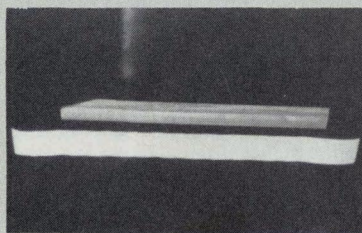
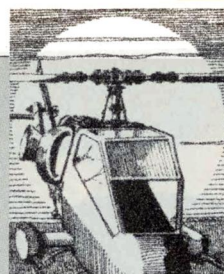


USING

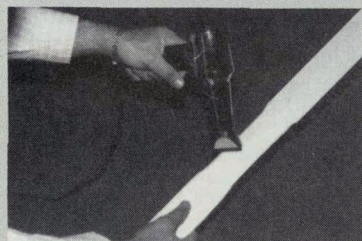
# HEAT-SHRINK BLADE COVERING

*Mylar Tubes Fit Your Rotors Like Danskins.*

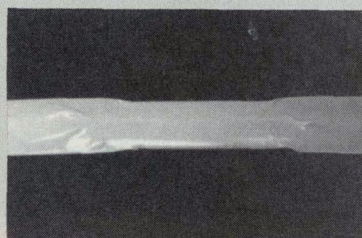
by RON FARKAS



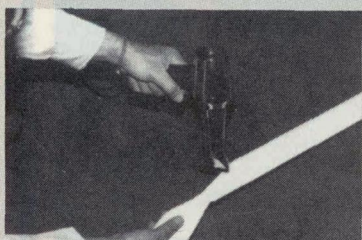
*Du-Bro Mylar heat-shrink (below) prior to being slipped over rotor blade (above).*



*With tubes slipped over rotor blade, start applying heat at center, working toward both ends.*



*While working slowly toward ends, check for uniform shrinkage and absence of bubbles.*



*Note uniform shrinkage even at blade-holder end of rotor blade.*

**T**HE MOST COMMON rotor blades are made from laminations of balsa and hardwoods, and therefore need to be protected by some kind of covering material. Generally, blades aren't painted because painting is time-consuming, it adds no significant strength and it makes it difficult to control the weight of the blades. Blade weights must be identical.

The two most popular covering materials are adhesive plastic and heat-shrink plastic. The former is a sticky-back sheet material resembling contact paper, but it's generally stronger and has a tenacious adhesive. It's applied simply by wrapping it around the lifting surface of the blade. The latter covering is a plastic sleeve that slips over the entire blade and is then shrunk tight against the surface by using a heat gun.

Both types of covering material have their drawbacks and advantages. Choice is a matter of personal taste. The self-stick variety is stronger, but it is questionable whether either covering material improves the inherent strength of the blade. Heat-shrink material is easier to use and, because it covers the whole blade, there's no need to paint or fuelproof a 3- to 4-inch section of the blade root. I prefer to use heat-shrink covering for its speed of application, and I'll describe a proven technique for its application.

Let's follow the covering process as shown in the photos. Heat-shrink material is made in a continuous sleeve, flattened and then rolled up, and finally packaged in lengths sufficient to cover one set of blades. Cut the material into two equal lengths; one length for each blade. Each piece will be about 6 inches

longer than the blade span. The longer the better, since you need to have sufficient material to grasp when stretching the root and tip. Photo No. 1 shows the covering next to a blade for size comparison. Some modelers reinforce the blade root using fiber glass cloth, which they apply with either resin or cyanoacrylate. This step should, of course, be completed and the root sanded smooth prior to covering. Make sure that the finished root fits into the blade holder since you can't sand it down later without ruining the covering job.

Now slip the covering material over the blade leaving enough to grasp at each end. Try to have more excess length at the root, as this area will probably require the most stretching. However, make sure that some of the material extends beyond *each* end of the blade.

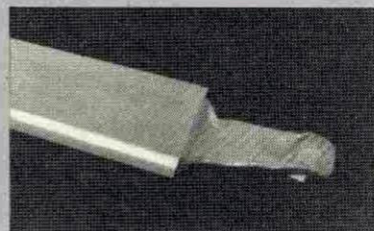
You'll need a heat gun to shrink the material. As shown in photo No. 2, start applying the heat near the center of the blade's span. Shrink an area several inches wide on one side of the blade and then an equal amount on the opposite side. Keep the gun moving back and forth to avoid burning a hole in the material. This can happen rather suddenly if you're not careful. Don't worry about the creases in the material as they'll disappear when the material is shrunk down tight around the blade. Photo No. 3 shows how smooth and tight the material is after shrinking. The areas that haven't yet been heated appear to be very wrinkled, but these too will smooth out as you work toward the ends of the blade. Just continue the process, alternating from one side of the blade to the other.





*Excess material ready for trimming.*

As you reach the root end of the blade, you'll have to start stretching the material while applying heat, in order to make it conform to the blade's taper. This is a two-handed operation, so it helps if you can either clamp the blade down or ask a friend to hold the other end. As shown in photo No. 4, you should grasp the excess material and pull fairly strongly while heating both sides. The covering material will stretch spanwise and shrink chordwise for a smooth, snug fit. Again, be careful not to burn a hole in the covering. After shrinking it, maintain some tension on the material for a few moments while it cools. Since the tip of the blade is squared off, it will not require as much stretching.



*Excess material at opposite end also ready for trimming.*

This plastic covering material becomes rather hard and tough after it cools. Photos No. 5 and No. 6 show the typical shape of the cooled material at the root and tip. In this hardened condition it's very easy to slice the

excess off with a razor blade, using the rotor blade end as a guide for a straight cut. The raw wood should then be sealed with paint or cyanoacrylate for protection against fuel and oil. Photos No. 7 and No. 8 show the finished root and tip after trimming and sealing. Photo No. 9 shows the finished root of a blade that has a wood blade holder installed prior to covering. That completes the covering process.

If you burn a hole in the material, you'll notice that further shrinking makes the hole grow larger. To prevent this from happening, apply some cyanoacrylate to the affected area to seal the exposed wood, and bond the covering to the blade surface. Continue the shrinking, and later cover the open area with a piece of adhesive trim tape which will hide the hole.



*Blade-holder end of blade after trimming, with mounting holes completed.*

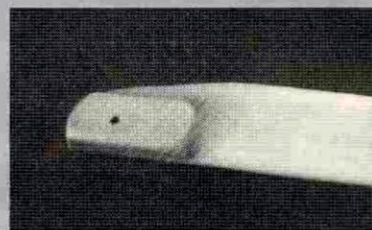
There is one variation on this method, and I recommended it for high-performance machines and aerobatic flying styles. I've heard that the material can lift slightly from the blade surface under certain conditions, since it isn't held in place by any adhesive. The remedy for this situation is to apply either a coat of Coverite\* Balsarite or a light spray coat of clear polyurethane paint directly to the bare blade just before covering in the usual manner. Whichever product is used, it should be applied evenly to ensure that the blades don't get out of balance, and it shouldn't be allowed to dry fully before the covering itself is applied.



*Finished and trimmed rotor blade tip.*

One other consideration is that heat-shrink covering material shouldn't be used on blades that have a reflexed airfoil section because it will bridge the gap between the high point and the trailing edge. Other than this special case, it doesn't matter if the airfoil is symmetrical, semi-symmetrical or washed-out, or whether the blade chord is constant or tapered.

The method shown here has worked consistently well for me. In my experience, blades covered with heat-shrink material look better than those covered with adhesive material. Heat-shrink material covers the entire blade



*Note excellent contouring even around reinforcement plate.*

without seams, and retains its high-gloss appearance. I think that it's much easier to finish a blade this way, and well worth the modest additional cost incurred if you have to buy the material separately. Good luck with your next covering job.

*\*The following is the address of the manufacturer mentioned in this article:  
Coverite, 420 Babylon Rd., Horsham, PA 19044.*

## **F-15 Eagle**

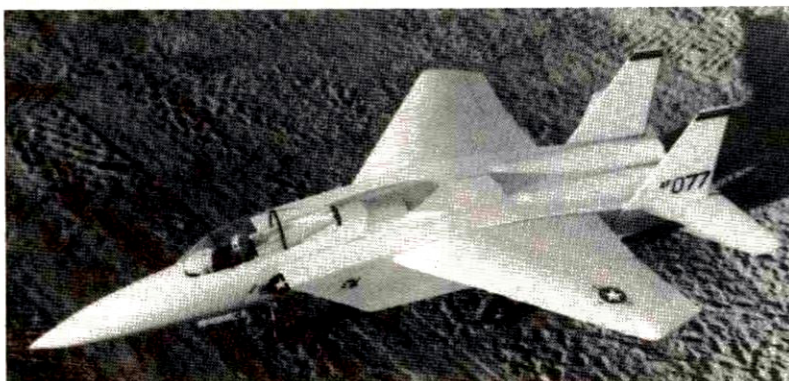
This ducted fan jet uses a single Turbax or Dynamax fan unit. It is an all wood kit with a fiberglass duct tube. The simple step-by-step instructions make this an easy kit to build. Can also be ordered partially pre-built. Send for free photos and brochure.

Length - 5 ft.      Weight - 7 lbs.  
Wingspan - 42 in.      Radio - 4 Channel

\$149.00 plus \$5.00 shipping

**ZACK-O Plastics**

P.O. Box 1082, Folsom, CA 95926





## FLOATING

(Continued from page 60)

beginner, the experienced, and those in between.

Apart from the Beaver, the only other plane to elicit as many responses to this column has been the PBY-5A Catalina. I'm happy to report that a 9-footer is nearing completion in our club and a report will follow soon.

*\*The following are the addresses of the companies mentioned in this article:*

Unionville Hobby Supply, P.O. Box 135, Markham, Ontario, Canada L3P 3J5.

Pat Grubbs, M.D.M. Company, 7364 Carmella Circle, Rancho Murieta, CA 95683.

## BIG STIK 20

(Continued from page 69)

shrinkage produced the scalloped edge.

I was able to build the model quickly. Following the instruction book and checking off each step as you complete it will ensure a superior model. The plans offer a choice of two versions. I built the tail-dragger version with nylon bolts as wing hold-downs. For new flyers, the trike gear and dowel rubber-band wing hold-down might be a better system. **PERFORMANCE:** One of the first things

you notice when you place the completed Stik on the runway for the first time, is that the main gear and tailwheel strut lengths allow the model to sit at a nearly level attitude, almost like a nose-wheel-equipped airplane. The use of the O.S. mandated a prop of 10-inch diameter

minimum, and this reduced the available prop clearance. It wasn't worth worrying about though as, with the abundance of power available, the Stik will nearly do a three-point *takeoff*! The control throws were just fine for me; comfortable and not too sensitive. The only trim it took was a

## Precision Tools



Taps, open end wrenches, hex nut drivers, phillips and allen drivers, and screwdrivers. The tools feature interchangeable or individual handles and Tuff-Tempered tips. Packaged in convenient molded plastic storage cases. Send 25 cents for complete size listing and catalog. K & S Engineering, 6917 W. 59th St., Chicago, Illinois 60638. Telephone: 312/586-8503.

**K&S**

# FASTEST

THE **Viper**

## SETS NEW STANDARDS FOR MODEL JET PERFORMANCE

*Exclusive Design Features:*

- **FULL FLOW INLET**—no cheater hole or over-sized inlets.
- **MAGNACORE WING**—Foam-Carbon Fiber-Balsa
- **REMOVABLE WING**—for convenient transit
- **HIGH LIFT DEVICES**—Flaperons, LEX's, NACA droops.
- **EPOXY GLASS/KEVLAR**—fuselage, hatches, inlets, lips, tail pipe.

**YOU CAN HAVE IT ALL—THE FASTEST, THE SLOWEST, AEROBATIC MANEUVERABILITY AND GREAT LOOKS TOO!**

**BOB VIOLETT  
MODELS**

1373 Citrus Road, Winter Springs, FL 32708

**(305) 365-5869**

Speed Range 25–175 MPH

# SLOWEST



POWERED BY:



U.S. Patent  
#4,685,289

**FOR MORE  
INFORMATION**

Send \$ 3.00 for Jet Info Pack and/or  
\$10.00 for "Inlet" Subscription

**PRICE: \$425.00** **POWER SYSTEM  
NOT INCLUDED**

ALL COMPONENTS MADE IN THE USA



# Fiberglass Cowls

## BALSA USA

Citabria Aerobatic Pro.....20.00  
der Jager.....22.00  
Fly Baby 1/4 scale.....22.00

## BUD NOSEN-A&A INDUSTRIES

Aeronca Champ .40 size.....12.00  
Citabria 1/4 scale.....18.50  
Decathlon 1/4 scale.....20.00  
P.47 full length with flaps.....24.00  
P.51 full length cowl.....24.00

## GREAT PLANES

CAP 21 .40 size.....12.00  
CAP 21 .60 size.....18.00  
Cherokee .40 size.....12.00

## PICA

Aeronca Sedan 1/4 scale.....15.00  
Cessna 182.....14.00  
Cessna 182 1/2 scale.....20.00  
FW 190 D.9.....11.00

## PILOT

Christen Eagle .60 size.....20.00  
Christen Eagle 1/4 scale.....25.00  
Decathlon .40 size.....15.00  
Decathlon 1/4 scale.....20.00  
P.T. 19 1/2 scale.....20.00  
Rainbow.....19.00

## SIG

J-3 & Clipped Wing Cub.....8.00  
Super Cub .40 size.....10.00

J-3 Cub 1/4 scale.....15.00  
with engine.....18.00  
Super Cub 1/4 scale.....18.00  
Kadet Sr.....8.00  
Liberty Sport.....12.00  
Skybolt.....10.25

## TOP FLIGHT

F4U.1A Corsair.....14.00  
P.40 Warhawk.....10.00  
P.47D Thunderbolt.....11.00  
Piper J.3 Cub.....8.00

## OTHER KITS

ASTRO FLIGHT: Porterfield.....6.50  
CONCEPT: Fleet Biplane.....15.00  
GOLDBERG: J-3 Cub.....10.00  
MIDWEST: Pitts Special.....18.00  
TOWER HOBBY:  
RV3 .40 size.....12.00  
WORLD ENGINE: CAP 21.....12.00

## TOM THUMB 1/4 scale

Monocoupe 90 AL.....20.00  
Pietenpol Sky Scout.....15.00  
Pitts Special S-2A.....22.00

## W.E. TECHNICAL SERVICES PLANS

Cutlass Falcon 0-18-A3  
Cowl and Spinner.....30.00  
Mighty Hog.....15.00  
Snow White.....8.00  
Spad XIII C1.....25.00  
Waco SRE.....8.50



## FIBERGLASS MASTER

Dept. MAN Rt. 1, Box 530  
Goodview, VA 24095

## ORDERING INFORMATION

Within the 48 continental states add \$3.00 shipping charge. Va. residents add 4% sales tax. C.O.D. accepted (add \$2.65 to shipping charge). Outside 48 continental states, write for shipping charges before ordering, include \$1.00 U.S. for return postage and handling.

## PHONE ORDERS & INFORMATION

703-890-6017 9 a.m. to 9 p.m. EDT.

Also available radial cowls, wheelpans and hundreds more cowls for other kits and plans. Send SASE for 6-page brochure.

Coverite, 420 Babylon Rd., Horsham, PA 19044.

MonoKote; Distributed by Top Flite Models, 2635 S. Washash Ave., Chicago, IL 60616.



## OSPREY

(Continued from page 39)

sand the bottom surface as smooth as possible. Then put the blank on the mold and tape it in a couple of places to keep it from sliding around. The leading edge of the blank must be flush with the front edge of the mold.

Next, cover the wing blank evenly with a piece of soaking, wet denim, salvaged from the leg of an old pair of jeans. Using a flatiron or a MonoKote iron, press the wet denim until it's dry. The steam from this process penetrates and softens the balsa, forcing it to conform to the airfoil contour on the mold. However, one other step is necessary to ensure that the steamed-in curvature is a permanent one.

Take a piece of thin, white posterboard of the same size as the wing blank. (It can be made in two pieces, if necessary.) Remove the denim from the sheet balsa and put the posterboard in its place. Finally, tightly wrap the whole sandwich

(Continued on page 78)

small amount of nose UP. I expected this because I didn't add any tail weight to compensate for the greater weight of a 4-stroke engine. I had installed all the radio gear as far aft in the compartment as possible, but it still wasn't quite enough. The CG recommended by the manufacturer is right on the money.

I flew the Stik four times on test day and quit only because it was getting late. I've since logged a good number of additional flight hours, and find that it gets more comfortable as I go along. It's a good sport airplane, and an everyday flyer that will sharpen your skills. Its size is very manageable and it really doesn't need the power of the O.S. but, as long as it's there, you can explore new heights,

vertically! There have been many versions of the generic Stik designed, and even kitted, over the years. Most of these seem to exhibit the same broad flying envelope, which is well suited to the advanced novice and intermediate level flyer. All other things being equal, one must look to the kit for differences. Great Planes has done a fine job on this one. If any single model design is destined to become the modeling equivalent to the ubiquitous Piper Cub, the Stik may just be it.

\*The following are the addresses of the companies mentioned in this article:

Great Planes Model Distribution, P.O. Box 4021, Champaign, IL 61820.

PIC, 943 Stierlin Rd., Mountain View, CA 94043.

# WORLD CLASS ZINGER FUEL

**A HIGH PERFORMANCE MODEL ENGINE FUEL** for use in all conventional Glo engines including 4 cycle, A.B.C.s and A.B.N.s.

## ANOTHER QUALITY PRODUCT FROM THE "HOUSE OF ZINGER"

Has top state-of-the-art additives that produce:

- Minimum Wear and Friction
- Excellent Acceleration
- Excellent Idle, Midrange and Top End
- No Rust (No After Run Lube Needed)
- No Foam
- No Carbon Build Up
- Plating Action Needed for A.B.C. and A.B.N. Engines

★ Also Available to Dealers

**Produced by: Jo-Z Products, Inc.,**

25029 S. Vermont Ave., Harbor City, CA 90710

(213) 539-2313



Stock No.	Fuel %	Retail Price Per Case of 4
6049	12 1/2%	\$45.60
6050	FAI Fuel	35.60
6051	5%	39.60
6052	10%	43.60
6053	15%	47.60
6054	25%	67.60
6055	40%	87.60
6056	50%	103.60
6057	60%	107.60
6058	4 Cycle	47.60

Price Includes Shipping  
Minimum Order: 1 Case



# OSPREY

(Continued from page 76)

of mold, balsa, and posterboard with an elastic bandage. Set this aside for a day or so to allow all the moisture and the uneven stresses to dissipate.

When the wing blank is unwrapped, it will have a permanent airfoil contour. To complete the wing, cut it to the outline shape, then sand the leading edge to a radius, and the trailing edge and tips to a gentle taper.

I always support the wing on the mold when I'm shaping and sanding its top surface. The mold is also useful while fitting and gluing the dihedral joint. It's extremely important to keep the wing airfoil from getting distorted during the assembly procedure.

The Osprey's tail is made from thicker sheet balsa than is usually seen on a model of this size. This extra thickness provides stiffness, and also a smooth airflow over the control surfaces. However, the Osprey's tail need be no heavier than the typical 1/8-inch-thick surfaces of most 1/2A R/C models.

The secret to this is in lightweight wood, and plenty of shaping and sanding. All the tail parts are tapered from root to tip, and have a streamlined airfoil. They are thus thicker where the loads on them are high, and thinner elsewhere.

As you can see from the plans and photographs, the Osprey's fuselage contains some intricately shaped parts. There aren't a lot of them, but they have to be accurately cut if the model is to fit together correctly.

I use a Dremel scroll saw for all this sort of work. It's useful for all types of model woodworking, and I think every modeler should own one. The price is reasonable (around \$75, mail order from Tower Hobbies\*) and the quality is superb. The Dremel scroll saw is the perfect tool for cutting out precisely shaped model parts such as the Osprey has. With the fuselage parts cut to shape, begin assembly by lashing the landing gear wires to their double bulkhead. I use Sig's\* Dacron 1/2A U-Control line for this; it's far stronger than thread.

The doublers can now be glued in place on the fuselage sides, followed by the vertical stiffeners. The fuselage assembly is straightforward—just be sure you don't build a twist into it!

It's best to install the Nyrod guide tubes before sheeting the fuselage top and bottom. Anchor them firmly; if they come loose later you may have control problems.

The plywood parts at the nose need some explanation. First, the engine is mounted off-center, and tilted both downwards and to the right. With the engine mounted in this way, the model will fly the same under power as in a glide. The Osprey is designed as a 2-channel airplane, and it's meant to be flown with full throttle until the engine quits; whereupon it glides gently down to a 3-point landing.

Second, the R/C track is attached to the back of the firewall with the screws and the aluminum bracket shown. The holes where the bracket is attached to the track contain rubber grommets, such as R/C servos use, to allow flexibility and

provide shock absorption for the track.

Eight T-nuts are needed: four, 4-40-size to be installed in the front bulkhead for holding the engine-R/C assembly in place; plus four, 3-48-size on the back side of the firewall, for mounting the engine. Glue all these firmly in place with cyanoacrylate.

Now for the R/C track. At the front there's space for a 1-ounce round Sullivan\* clunk tank. If the 3 1/2-minute engine running time of a Black Widow's stock tank is enough for you, you won't need to bother with the plumbing required to add this auxiliary fuel supply. Otherwise, the setup shown schematically on the plan works quite well, and provides about 10 minutes of engine run.

Use 3/32-inch brass tubing in the tank instead of the 1/8-inch tubes supplied, and make the fuel connections with Ace R/C's\* small-diameter polyurethane tubing (catalog No. 60K51). Two extra holes must be drilled in the firewall for this; place them where the tubing won't get pinched between the back of the firewall and the front of the nose bulkhead! The tank should be lashed to the track with thread or Dacron cord.

The receiver and battery pack are held on the track with rubber bands which are passed through the holes along the track edges. Foam rubber pads placed between the track and the R/C items protect the equipment from vibration and shock.

You can extend the receiver antenna wire through an extra piece of Nyrod tubing installed in the fuselage rear, but I prefer vertical whip antennas. My Osprey uses one that screws into a socket (a 2-56 T-nut) in the center of the track. The whip itself is a 3-foot length of .047 music wire, soldered into a brass solder-type pushrod end connector.

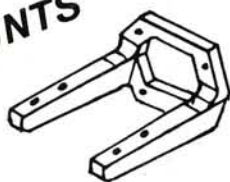
I cut short the original antenna wire from my receiver, and attached a small solder lug to the shortened end. This was located so that the total length of the antenna system (whip plus receiver wire) is exactly the same as the original antenna length.

At the rear of the track there's a setup that simplifies battery charging. The charge receptacle is permanently mounted to the fuselage, and connected to a pair of contact wires which are screwed to the rear of the cabin bulkhead. These wires make contact with a pair of small, sheet-brass terminals on the track end, which are wired to the charge contacts of the switch.

As for the switch, it's also mounted on the track, and is actuated by a removable

(Continued on page 82)

## IT'S **TATONE** for precision Aluminum MOTOR MOUNTS



### FOUR CYCLE

Alloy Aluminum Machined Beams		Drilled & Tapped 90° Thrust Line	
<b>O.S.</b>		<b>ENYA</b>	
FS-20	\$7.50	35/40-4C	\$8.95
FS-40/40S	8.95	46-4C	8.95
FS-48	9.95	60/80/90/	
FS-60/75/90	12.95	120-4C	12.95
FS-61	12.95	120-4C	21.50
FS-120/120S	19.95		
<b>HP</b>		<b>SAITO</b>	
VT-21	\$7.50	FA 40/45	\$8.95
VT-49	8.95	FA 65	12.95
		FA 120	19.95
<b>WEBRA</b>		Undrilled	
T4-40	\$8.95	60-90	\$11.25
TA-60/80	12.95		

### TWO CYCLE

Machined Beams Engine Mounting Bolts Incl.	
1/2A Sh Bm	\$3.90
1/2A Lg Bm	4.10
.09	4.75
.15 Lg Bm	4.95
.19-3.5CC	5.85
29-40 Lg Bm	6.80
40-61 Sh Bm	6.50
40 RV Pylon	7.75
60 Pattern	10.25

### GIANT SCALE

Alloy Aluminum Machined Beams Engine Mounting Screws Incl.	
OS Max 90	\$19.25
OS Max 1.08	19.95
Super Tigre-2000,	
2500 & 3000	19.95
Zenoah G-38	19.95
Quadra	
35/40	21.50

**C.B. TATONE, INC.**

21658 Cloud Way • Hayward, CA 94545  
In CA 415-783-4868 • Out CA 800-482-8663

If not available from your hobby shop, ORDER DIRECT. Check, MO, VISA, MC or COD accepted. Add \$2.50 for S&H, 2.00 for COD. California residents add 6 1/2% sales tax.



## OSPREY

(Continued from page 78)

arm that extends through the fuselage side. On my Osprey I used a threaded pushrod end which screws into a hole drilled in the switch toggle.

The arrangements described in the last four paragraphs allow the engine R/C assembly to be removed from the airplane without interference from dangling wires.

The control horns and clevises *must* be Rocket City's Mini Horn and Clevis (available from Ace R/C). This is the only type of clevis that is small enough to slide

through Nyrod guide tubing, and it's what makes the Osprey's track-type R/C installation possible.

The Osprey has transparent windows, not only for realism, but so that you can see to line things up when you install the engine-R/C assembly. I used plastic from a 2-liter pop bottle for the windshield, and Sig's clear butyrate plastic sheet for the side windows. All are glued in place with Plasti-Zap, with a bead of Wilhold's R/C-56 along the bottom edge of the windshield for a good seal.

Don't use an iron-on covering on the

Osprey! It's heavy, and will deform the wing airfoil. The best and lightest finish is Sig's Lite-Coat clear dope, which I've used on most of my sheet-balsa models for years. I don't try to make my airplanes look as though they're made of plastic. My motto is: "Balsa is beautiful!"

The decorations on my Osprey were mostly cut from black tissue with a sharp X-Acto knife, and then clear-doped in place. I used colored dope for the rudder striping and, one of these days, I'll paint the official U.S. Coast Guard insignia on the cabin, for that extra touch of authenticity. The Osprey isn't a scale model, but it's very realistic-looking, and this is mostly because of its detailed decorative scheme.

With a 2-channel Cox\* Cadet radio equipped with a 250mAh Ni-Cd battery pack, my Osprey weighs 25 ounces ready-to-fly. Control movement is 1/4 inch each way for the elevators, and 1/2 inch for the rudder.

I use a 7-3 Graupner propeller on a stock Cox Black Widow for power, and use Cox racing fuel with an ounce of castor oil added to every pint. I reversed the fuel tank on the engine so that the needle valve would remain on top with the motor itself inverted. The needle has a wire extension soldered into a hole drilled in its knob.

The Osprey won't fly upside-down because of its airfoil. However, it will do any maneuver that the full-size U.S. Coast Guard Waco biplane of 1938 was capable of, including loops, spins, and snap rolls. To accomplish some maneuvers, the Osprey needs to build up airspeed with a shallow dive—but so did the '38 Waco. This is an airplane that flies on its wings rather than on brute horsepower!

*\*The following are the addresses of the companies mentioned in this article:*

Wing Manufacturing, P.O. Box 33, Crystal Lake, IL 60014.

Tower Hobbies, 1608 Interstate Dr., P.O. Box 778, Champaign, IL 61820.

Sig Manufacturing Co., 401 S. Front St., Montezuma, IA 50171.

Sullivan Products, 1 North Haven St., Baltimore, MD 21224.

Ace R/C Inc., 116 W. 19th St., Box 511C, Higginsville, MO 64037.

Cox Hobbies, 1525 E. Warner Ave., Santa Ana, CA 92705.



## THE ASTRO CHALLENGER NATS ELECTRIC WINNER

Bob Boucher's Astro Challenger won the 1984 Reno Nats its first time out and has been winning electric contests all over the country ever since. Powered by an Astro Cobalt 05 Geared System with a 12 inch folding propeller, the Challenger climbs almost out of sight in 45 seconds and repeats this climb three or four times on a single charge. The distinctive wing planform with elliptical wing tips maximizes aerodynamic efficiency and minimizes tip stalls. This contest champion has a very gentle and forgiving nature so it's perfect for beginners too. The deluxe kit features all machine cut and sanded balsa parts and is super easy to build and fly. Wing Span 72" • Area 612 Sq" • Airfoil Eppler 193 • Flying weight 39 oz.

ITEM #1020 .....\$49.95

## "THE QUIET WINNER"

Proudly Made In The U.S.A.

**ASTRO FLIGHT INC.**

13311 BEACH AVE. • MARINA DEL REY, CA 90292 • PHONE (213) 821-6242





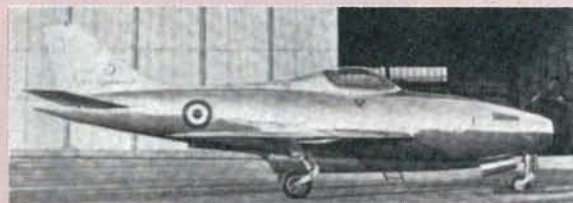
# NAME THE PLANE CONTEST

## Can you identify this aircraft?

If so, send your answer to **Model Airplane News**, Name the Plane Contest (state issue in which plane appeared), 632 Danbury Rd., Wilton, CT 06897.



Congratulations to Ted Vinzani of Florence, SC, for submitting the *sole* correct entry identifying the Italian Aerfer Sagittario 2 in our January '88 issue. Other readers identified the Sagittario as everything from the Fuji T-1 trainer to the Fiat G-91. First flown in May of 1956, the 5,000 pound Sagittario was capable of 0.8 Mach with its Rolls-Royce Derwent turbojet. Although developed as a single-seat, fighter bomber, it didn't see full-scale production but was used as a development test vehicle.



The winner will be drawn four weeks following publication from correct answers received by postcard delivered by U.S. Mail and will receive a free one-year subscription to **Model Airplane News**. If already a subscriber, the winner will receive a free one-year extension of his subscription.

## MOVING TIME

(Continued from page 27)

together using a Dremel and finishing nails after first gluing the edges. Cut the lid off (after assembly) with a circular saw or saber saw and then add all the furring reinforcement and the hardware. Sand exterior edges to help prevent chipping and use a magic marker to identify which end is up. Add a string to keep the lid from falling open too far and damaging the hinges. Staple a cardboard piece into the lid and you're done.

To mount the plane part inside, get some safety wire and a small drill. For the fuselage I drilled two small holes next to the gear axles and ran the wire through the two holes in the box. The wire ends twist to the gear and the plane is held very firmly. Keeping as much room between pieces as possible ensures that any slight movement which may occur does not result in damage. In tight areas some packing foam might be needed to protect the skin. Most of the wings were wrapped in thin paper or foam sheet and then placed carefully in the lid compartment. Five models were packed in the first box I built and moved from Sacramento, CA, to Abilene, TX, with four months of

storage en route. All the airframes arrived undamaged, but the sailplane I carried in my car got smashed!

The project costs about \$20 to \$30. To me that's cheap insurance considering the value of the planes. Even if your shipment has to go into storage for a while, you can rest assured that your prized models will be delivered in better shape *this way* than by any other method.

## SILENT FLIGHT

(Continued from page 23)

### A Unique Club

The Electric Fun Flyers of Santa Ana, CA, are probably unique. To the best of my knowledge, they are the only club around that has the use of a public park for the flying of electric R/C models. Organized by Frank Heacox, the EFF's purpose is to enjoy the pleasures of quiet electric flying. They don't have any organized meetings or hold big contests; they just have a good time. The amazing thing is that although Centennial Park is right in the middle of a densely populated residential area, nobody has complained about the flying. The EFF has some restrictions governing the models that are able to fly in the park. This keeps flying

within safe bounds.

Another unique feature of the park that the EFF uses, is the fact that the flying field is bordered on one side by a pond that's large enough for ROW (Rise-Off-Water) flying. John Amies regularly flies a twin .05-powered flying boat (a modified Ken Willard design) with great success. Recently the EFF was filmed by a local cable television crew who were covering recreational activities at the park. This is the kind of publicity that really helps the R/C hobby. Congratulations to the Electric Fun Flyers!

## SW FAN FLY

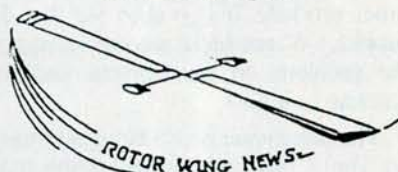
(Continued from page 47)

the powerplant installation and it was going well. (Might have even flown by the time you read this.) This is a tremendous undertaking which eclipses even the gestation period for elephants. I think that Butch just might try a kit after this! Speaking of Lyn McCauley, if he doesn't bring an *airplane* to this get-together, you can be sure that one of his *designs* will show up. This year co-C.D., Ed Couch, brought one of Lyn's early efforts, a Republic F-84F Thunderstreak. I first

(Continued on page 86)



# Club of the Month



## NCRCHA

The National Capital R/C Helicopter Association of Silver Spring, MD, is our "Club of the Month" for March, 1988.

The official season for the NCRCHA ended with their last fun fly at the Meade Modelers' flying field. The field is currently being renovated with the addition of fences and impounds, and the runway is being repaired, but this didn't affect our V/STOL enthusiasts. The fun fly was a success with modelers exhibiting all the daredevil maneuvers that usually accompany helicopter flying, along with a few first-time autorotations with no hard hits! Congratulations!

The monthly club newsletter, "Rotor Wing News," is edited by Glenn Scillian. This particular issue of the newsletter included a list of all the club members as well as a list of those who subscribe to the newsletter. The membership list is quite impressive and the list of subscribers stretches from Connecticut and New York to California and Arizona!—Another testament to the growing popularity of R/C helicopters. "News from Baltimore," a section of the newsletter, contains a close-up look at an X-Cell helicopter and some flying tips. There's a forum for readers' comments and an interesting section called "Bits From Other Newsletters." This contains an excerpt called "Wimps vs. He-Men; Ten Ways To Tell Whether Your Flying Partner Is A Wimp!" Another interesting item in the newsletter is the piece on the NCRCHA sister club, the Maryland Off-Road Racers. In the past, we've seen many flyers turn their backs on all but the winged breed of R/C models and we're glad to see this group get involved. Anyone who'd cut the throttle on his expensive copter and let it fall like a stone until it's only inches away from the ground will try anything!

The staff at *Model Airplane News* is proud to award the National Capital R/C Helicopter Association two, free, one-year subscriptions, which are to be given by them to a couple of the club's outstanding members.

Congratulations!

P.S. Just remember guys, only wimps use collective pitch; he-men use the wimp's copter for autorotation!

Each month *Model Airplane News* will select the club newsletter that best shows the club's activities and energies directed toward the furtherance of the hobby. The award is not based on size or quality of the newsletter, and can be about any aspect of the hobby (F/F, C/L, R/C, boating, cars, etc.). *Model Airplane News* will award two free one-year subscriptions to be given by the club to outstanding junior members. So send your newsletter to *Model Airplane News*, Club of the Month Contest, 632 Danbury Rd., Wilton, CT 06897.

# MODEL AIRPLANE NEWS HOBBY SHOP DIRECTORY

**Retailers:** Make your business grow with new traffic! Now you can advertise your hobby shop in the *Model Airplane News Hobby Shop Directory*. The listing will be published monthly and will be listed according to city and state. You will have 3 to 4 lines, approximately 20 words, in which to deliver your sales message, plus space for your store's name, address, and telephone number.

## CALIFORNIA—Torrance/Gardenia

Your one-stop R/C shop. We try to carry it all. Major items discounted. Help and advice free. Building and bull sessions allowed on premises. Owner: John Eaton.

### MODEL CENTER

2304 Redondo Beach Blvd. 327-3862

## CONNECTICUT—Bristol

15 minutes from Hartford. Complete stock of R/C boats, cars, airplanes, and helicopters. Also, two-and four-cycle engines. All major items discounted. Hours: Mon., Tue., Wed., 10-7; Thu., Fri., 10-8; Sat., 10-5:30; Sun. Nov-Jan. 1-4.

### BRISTOL HOBBY CENTER

641 Farmington Ave., Rte. 6 583-7273

## CONNECTICUT—Norwalk

Connecticut's leading R/C shop, 15 years experience flying and selling radio control. Over 3,500 different items in stock. Custom ordering for hard-to-find parts.

### AL'S R/C SUPPLIES

54 Chestnut Hill Rd. 846-9090

## FLORIDA—Miami

R/C airplanes, cars, boats, and helicopters. Mon. thru Sat. 9-6.

### ORANGE BLOSSOM HOBBIES

1975 NW 36th St. 633-2521

## FLORIDA—Orlando

When in Disney World, stop and see a complete line of R/C planes, boats, cars, rockets, and accessories.

### BOB'S HOBBY CENTER, INC.

7333 Lake Underhill Rd. 277-1248

## GEORGIA—Austell

R/C Specialists, U/C Specialists, aircraft, boats, cars, helicopters. Sig. Futaba, Tamiya, Red Max. Hours: Mon.-Fri. 11-7; Sat. 10-5; closed Sun.

### HOBBY JUNCTION

5095 Austell Rd. 941-3448

## ILLINOIS—Chicago

Chicago's largest hobby shop. R/C planes, helicopters, boats, and cars. R/C Repairs, installations, and custom building. Mon.-Fri. 10-9; Sat. 9-6; Sun. 11-4.

### STANTON HOBBY SHOP, INC.

4734 Milwaukee Ave. 283-6446

## MINNESOTA—Minneapolis

R/C modelers, attn., helicopters, cars, airplanes, boats. If it moves, we R/C it! Futaba, Airtronics, Acoms, O.S., Enya, Associated, Tamiya, Kyosho. Mail orders welcome, we ship UPS daily. Mon.-Fri. 10-9; Sat. 9:30-5:30; Sun. 12-5.

### HUB HOBBY CENTER

6416 Penn Ave. S. 612-866-9575

## NEW JERSEY—Jackson

R/C planes, boats, cars, and helicopters with extensive hardware dept. Parts and service, custom-built products, all with expert advice. Hours: Mon.-Fri. 10-8; Sat. 10-5.

### JACKSON HOBBY SHOP

RD 5, Box 12, W. County Line Rd. 364-3334

## NEW JERSEY—Mercerville

Complete line of planes, Robbe, Sig. Kraft, Great Planes. Large R/C selection plus trainers, boats, and all other hobby needs. Open 7 days.

### IRON HORSE HOBBIES

116 Flock Rd. 586-2282

## HOBBY SHOPS: Act now and get first ad free!

Directory space is sold on a yearly basis with a choice of three payment plans: 1. \$179 per year, payable in advance; 2. \$97 for six months, payable in advance; or 3. \$17.50 per month to be billed monthly. Space reservations must be received by the 20th of the third month preceding publication (for example, January 20th for the April issue).

## NEW JERSEY—Red Bank

Full-line hobby shop. Ask us, we will compete with mail-order prices. Mon.-Wed. 10-6, Thu. 10-8, Sat. 10-5, Sun. 12-4.

### HOBBYMASTERS

62 White St. 842-6020

## NEW YORK—Elmsford

A complete R/C hobby shop, carrying a full line of supplies and parts for R/C airplanes, cars, and boats with 40 years R/C experience. Mon., Tue., Fri. 10-6, Thu. 10-9, Sat. 10-5.

### ANDY'S HOBBY SHOP, INC.

36 E. Main St. 592-5176

## NEW YORK—Kingston

Full service hobby shop: R/C aircraft, boats, cars, complete supplies and accessories. Model trains and equipment. Model rockets and supplies. Plastic kits. Mon.-Thu. 10-6, Fri. 10-9, Sat. 10-5.

### J AND J'S HOBBIES, INC.

37 North Front St. 338-7174

## OHIO—Cincinnati

Full Line Shop—R/C Planes, Boats, Cars, Parts & Accessories—Trains, LGB, Lionel, HO and N—Rockets, Paint Sets, Tools, etc.

### DEWAR EQUIPMENT COMPANY

4915 Glenway Avenue 921-5366

## OHIO—Findlay

Findlay's local R/C dealer, planes—cars—boats. We specialize in R/C, large selection of kits, accessories, and parts. We are authorized Sig and Dremel dealers. Also sell plastic kits and model rockets. Tue. & Thu. 3-9, Mon., Wed., Fri., & Sat. 10-9.

### JINX MODEL SUPPLIES

721 Rockwell Ave. 422-5589

## OKLAHOMA—Tulsa

R/C Specialists, planes, helicopters, cars and boats. We also have kites, boomerangs and plastics. Experienced personnel to answer all your questions. AE, Visa, MC. Hours: Mon.-Sat. 10-6, Thurs. 10-8.

### WINGS 'N THINGS HOBBY SUPPLY, INC.

5153 S. Peoria Ave. 745-0034

## RHODE ISLAND—Apponaug

Aircraft, boats, cars, U/C R/C technicians on hand till 9. All supplies carried, engineering service. Mail order specialists.

### APPONAUG COLOR SHOP

1364 Greenwich Ave. 737-5506

## TEXAS—Houston

R/C airplane specialists, R/C cars, boats, helicopters. Plastic models, rockets, trains, HO & N. "Toys for Big Boys." Mon.-Fri. 11-7, Sat. 10-6.

### LARRY'S HOBBIES

156-F FM 1960 E. 443-7373

## TEXAS—San Antonio

Specializing in R/C airplanes with largest selection in southwest. Also boats, cars, helicopters, and rockets. Mon.-Fri. 10:30-6, Sat. 10-5. Since 1972.

### HOBBY CENTER, INC.

3439 Fredericksburg Rd. 735-4218

## LATIN AMERICA

### COSTA RICA—San Jose

Complete line of R/C airplanes, cars, boats, and helicopters. Parts and professional expert service and advice. Julio Pastura, President. Weekdays 4-10 p.m.

### EL HOBBY SHOP

Centro Commercial, San Jose 2000 Apartado 529, Centro Colon 32-26-81

Send sales message and payment to *Model Airplane News Hobby Shop Directory*, 632 Danbury Rd., Wilton, CT 06897. For further details or information on our special introductory offer, call toll-free 1-800-243-6685 and ask for Katherine Tolliver.



## DUCTED FANS

A 2-HOUR VIDEO CASSETTE WITH COMMENTARY  
BY RICH URAVITCH OF MODEL AIRPLANE NEWS

VHS-BETA

A gathering of "FANatics": Featuring Gloster-Meteor, F-104, A-10, F-3 Fury, Boeing 737, Byron's F-15, F-16's, SR-71, F-20, JHH's Cloud Dancer's K-FIR's, Bob Fiorenze's A-4, F-9/F-8 Cougar, Tom Cook's Starfire, F-4, B-52, Lear, A-4 Blue Angels and even the Concord!

Ducted Fans are maturing with the innovation and reliability that the rest of the R/C hobby enjoys.

Order your copy today, see what you hear about, read about, see what will be your next project.

\$29.95 Check or Money Order to: Video Specialties, Inc.  
P.O. Box 4557, Monroe, LA 71211-4557  
Visa/Master Card accepted/Postage & Handling \$2.50



## P-47

THUNDERBOLT

Scale ..... 2.3 inches/foot  
Wingspan ..... 92 inches

### SEMI-KIT INCLUDES:

FIBERGLASS FUSELAGE AND COWL, CLEAR PLASTIC CANOPY, PLANS—showing all ribs & formers plus wing, stab-elevator and fin-rudder structures.

SEMI KIT \$240.00 + \$10.00 shipping

AVAILABLE FROM:  
ROY VAILLANCOURT  
18 OAKDALE AVENUE  
FARMINGVILLE, NY 11738



## NEED THE REAL THING?

### U.S. MILITARY & CIVILIAN

#### FLIGHT CLOTHING

- EMBLEMS & INSIGNIA
- JACKETS
- FLYING SUITS
- HELMETS
- PARACHUTES
- LEATHER JACKETS
- FULL LINE OF NOMEX APPAREL
- COMMUNICATIONS
- SURVIVAL GEAR
- ACCESSORIES
- GLOVES
- G-SUITS

ALL NEW MANUFACTURE  
CURRENT MILITARY ISSUE

#### WATKINS AVIATION, INC.

15770 MIDWAY RD. HANGAR #6  
ADDISON, TX 75244  
214/934-0033



## SW FAN FLY

(Continued from page 84)

saw this airplane at the premier SWFF five years ago in Lockhart, TX. I've had a fuselage and Lyn's drawings ever since; don't know how Couch ever managed to build it without the drawings! Lyn has a bunch of new projects in various stages now; a bigger bunch if you include those still in his head.

A number of small airplanes were on hand, one being the RK-20-powered BD-5J developed by the Austin-based aerospace consortium of SEZ (Sewell/Eppright/Zeiger) AERO. Chief test pilot, R. Zeiger, has been asked to relinquish both his stock options and corporate position for finding one of the very few lights bordering the runway. Half of one wing panel was gone and, since removing a similar amount from the other panel would have raised the wing loading an unacceptable amount, the little BD spent the rest of the meet on the ground. It was last seen heading east to Larry Epifanio's Southeast Model Products\* with Larry measuring it up for a possible kit.

Another small airplane was a nearly finished 1/2A F-16 designed and built by Bob Corwin of Littleton, CO. This little cutie used the old RK-049 fan unit driven by a TD .051. Construction was of carved foam with a layer of lightweight glass cloth. It felt extremely light and might just fly quite well in relatively calm air.

Other manufacturers were on hand also, clearly demonstrating just how far ducted fans have come in such a short time. Bob Violett\* frequently had his rapid Viper/Aggressor series airplanes airborne, much to the satisfaction of the hundreds of spectators and also the participants. Bob's airplane kit, along with his Violett fan unit, is gaining wider acceptance now with more of them in the hands of the average modeler.

A number of examples were on hand,

with Rick Schafer's being among the nicest looking. Violett's own Viper was equipped with an experimental carbon fiber pipe which is designed to reduce the annoying shriek our beloved fans sometimes produce. It's good to see that the suppliers of products we use recognize the problem on the horizon and are reacting to it now.

The noise issue is also being addressed by Tom Cook\* who is also doing some testing in this area. First applications will obviously be targeted for his Dynamax fan unit but could certainly have potential application elsewhere. His second generation Starfire II should soon be ready for release along with his revised fan unit. Dennis Crooks (2nd place Scale Masters finisher) and Bill Harris were both flying pre-production Starfire II's this weekend.

Steve Korney\* had a number of his Hurricane fans installed in various airplanes and was flying throughout the meet. In addition to having his own fan unit, Steve produces custom pitched rotors to tailor the fan to your particular air-frame/engine combination. He offered to lend me a rotor to try in my Turbax III/Rossi .65-powered JHH\* F-86 Sabre. Alas, my cherished Sabre returned home in a much smaller package than when it travelled to Texas, I must have been...uh...hit, yeah, yeah, hit, *that's* the ticket! While most of the manufacturers present were demonstrating their products and answering questions about them, there was one exception. Chris Abate of the Loctite Corp.\* was not only demonstrating and answering, he was giving products away for entrants to try! I'm not talking *little* samples here; *full* packages of epoxy, solvent spray, decal remover, finishing resin and other products made their way to the outstretched hands of eager recipients. Some of these modelers may never use any other product again! Chris also presented Mike Kulczyk with

(Continued on page 89)

U.S. PATENT  
4221452



## Genuine HEAD LOCK™

FIRST AND STILL THE # 1 LOCKING GLOW PLUG CONNECTOR

"HEAD LOCK" MARK III (BRASS BODY, 30" LEAD)-----\$3.95  
"PROFESSIONAL" (STAINLESS STEEL BODY, 48" LEAD)-\$6.95

"HEAD LOCK" FITS ALL STANDARD 2 STROKE & 4 STROKE GLOW PLUGS

All of our products have always been fully guaranteed against defects of any kind. NO GUARANTEE REGISTRATION CARDS REQUIRED.

If Not Available, Write Direct; Add \$.50 (\$1.00 Outside U.S.)

MODEL PRODUCTS CORP. P.O. Box 100, ALLAMUCHY, N.J. 07820 (201)850 1508



## SW FAN FLY

(Continued from page 86)

the Loctite Award for the Best Scale Model.

While on the subject of awards, General Dynamics' F-16 project test pilot, Phil Oestreicher, presented Karl Hibbs with the G.D. plaque for best General Dynamics model. Karl is one of the three-man Skyriders demo team from the Puyallup, WA, area (along with Ron Kemp and Terry Malcolm) who fly Byron Originals\* F-16s and the new Byron Bullet. The Byron F-16 is still the predominant type at most of these fan flies. It's simply a good, honest airplane and, in my opinion, much more attractive than the Bullet.

I counted six Bob Parkinson Models\* Regal Eagles. This is another excellent opportunity for anyone who likes to work with balsa to experience the thrill of ducted fan flying. I've seen a sufficient number of these fly to be convinced that it flies well and, with some cosmetic rework, could be an even more convincing F-15-looking airplane. One of the models at the meet was particularly striking in a black VX-4 Navy finish, a la Bob Fiorenze's now famous F-4 Phantom.

When it's all tallied, there were 32 different types of airplanes in the line-up, a total of more than 77 planes, flown by 62 pilots. For those of you who are keeping score, here's my count of the highest-numbers... F-16 (10), Sport Shark/Aggressor (9), Starfire (6), Regal Eagle (6), F-86 (6), A-4 (4), and BD-5J (3). The rest were interesting subjects like Dr. Jack Lane's Douglas F-4D Skyray (not Phantom), Dennis Smerz's CASA-101, Dave Thompson's Canadair Tutor and Dave Hudson's as yet unflown Chance Vought F-8U Crusader which duplicated the variable-incidence wing of the original. No question about it; there's a lot of creativity involved in these projects.

The C.D.'s Award was presented to Bob Thacker who flew his Hurricane-powered Byron Kfir C-2 in Israeli markings. Bob is truly the epitome of cool, both in flying ability and adaptability. He wears a white shirt and string tie while the rest of us are nearly down to skivvies in the heat. He's a competitor and a real gentleman.

As I said earlier, I enjoy watching things grow; things like this gathering, the friendships, the imaginative solutions to nagging problems, the information exchange, the pile of dust on my last three started fan projects! That's about the only drawback I can see to attending this meet; if you're like me, you come away ready to tackle at least three new projects. See you next year?



Fits most engines  
.25 and up

Add 75¢ for shipping.  
Mich. residents add  
4% sales tax.

**Bru  
Line**

## For Long Engine Life BRU LINE AIR CLEANER

Completely fuel-proof nylon and rubber parts.

Cat. No. 102 Air Cleaner (coarse)	\$2.25
Cat. No. 202 Air Cleaner (fine)	\$2.25
Replaceable Inserts:	
Cat. No. 104 pk/2 inserts (coarse)	\$1.95
Cat. No. 204 pk/2 inserts (fine)	\$1.95

**SEE YOUR LOCAL HOBBY DEALER**

If unavailable locally, send to:  
**Bru Line Industries, Inc.**

P.O. Box 3786, Center Line, MI 48015

\*The following are the addresses pertinent to this article:

K&B Manufacturing, 12152 Woodruffe Ave., Downey, CA 90241.

Tom Cook, Jet Model Products, 304 Silver-top, Raymore, MO 64083.

Southeast Model Products, 14325 60th St. N., Clearwater, FL 34620.

Bob Violett Models, 1373 Citrus Rd., Winter Spring, FL 32708.

Steve Korney, Hurricane Fans, 14835 Hal-court Ave., Norwalk, CA 90650.

JHH (Jet Hangar Hobbies), 12130 G. Carson St., Hawaiian Gardens, CA 90716.

Loctite Corp., 4450 Cranwood Ct., Cleveland, OH 44128.

Byron Originals, P.O. 279, Ida Grove, IA 51445.

Bob Parkinson Models, 3 William St., Thornton, Ontario, L0L 2N0 Canada.

## GOLDEN AGE

(Continued from page 49)

movement, too subtle for the eye to see.

With the first digital systems, the stepping process was apparent to the eye. The first electronics were not microscopic. The analog people thought this was a disadvantage and were quick to point it out. However, in flight, the effect was not

apparent, and this shot down *that* theory.

As we now know, development improved radio performance, and more responsive servo amps and motors were found. It wasn't long before servo action became what we have today. Further development simply reduced size and weight while increasing power and reducing response time. The radios had to provide the information that could create the voltage characteristics which the servos needed to provide the desired action. You'll see that the analog and digital radios were very different from one another, but both gave useable results when the servo was reached and it came to controlling the aircraft.

I show a photo of an early experimental feedback servo. Realize that there was no magic wand which produced what we have now. Someone had to put the concept into hardware, prove the idea and then develop it into a practical form. With this one the designer chose to put two servos into one package—one to operate the rudder, and one, the elevator. Not a bad space-saving idea, even today!

The photo shows the workings, from left to right: In the cover are the amplifiers with their "canned" transistors (a far cry

## JACKSON HOBBY SHOP

RD 5, Box 12, Route 526, Jackson, N.J. 08527

201-364-3334

- A FULL-LINE, FULL-SERVICE HOBBY SHOP
- THE PARTS AND SERVICE SPECIALISTS
- CHECK OUR PRICES



5 mm x 11 mm BALL BEARINGS  
TO FIT TAMIYA AND MOST  
OFF-ROAD CARS—\$1.95 EACH.  
BEARING SET FOR  
ASSOC. RC10—\$49.95

MasterCard, Visa, or money orders please  
add \$2. handling on orders under \$40. NJ  
customers add 6% sales tax.

Prices subject to change without notice.



## GOLDEN AGE

from today's ICs!). Next, in the base, are those fabulous Micro-Mo motors, driving large output gears to get the desired speed reduction. In this prototype the designer has opted to use precision, military-quality potentiometers for the feedback pots. He probably had no maintenance problems with such high-quality components!

They were adapted very cleverly. The pot covers have been eliminated. The output gears have been attached directly to the pot-shaft and wiper carriage, so creating the link which made feedback

possible. In the photo you'll notice that the output arms are missing. They were obviously attached directly to the pot-shafts (a very good idea as these precision pots had excellent shaft-bearings). In retrospect, these servos probably operated without problems and easily proved the feedback servo concept to be a viable one.

By today's standards, this servo was very large (as most first prototypes usually are). For example, the *first* transistor was on a circuit board which appeared to be about 6 inches square! This servo was also obviously heavy, the pots alone weighing as much as one of our miniature servos! But, it was a good beginning and just needed package development.

A description of the many attempts to find a suitable miniature substitute for those large, precision potentiometers would fill a book. There were some small pots available but, unfortunately, they were not designed for the continuous wear in servo operation, and ultimately failed. One servo even used a linear pot element instead of a rotary one; it worked, but was large and required constant maintenance. Eventually, the Arco Company provided a ceramic pot element and suitable wiper, and these were the standard for many years. This element

wasn't without fault, and it took further development to reach today's trouble-free operation.

Continued reader input provides information of interest. One reader pointed out that in the early '50s few kit manufacturers offered R/C kits. With a dramatic increase in the popularity of the hobby, there was a great demand for more choice in plane designs. Fortunately, the magazines saw the need, and published many modelers' ideas. *Model Airplane News* was a leader and we soon saw many models built from magazine plans.

Brandon Clough of Dickinson, TX, reminds us that one of the most popular designs was the comparatively small (.049- to .09-powered) Liberty Belle. As shown in the May '53 Air Trials, this simple, boxy design with 40-inch span, was widely duplicated, and performed well with all sorts of "rudder only." The design was by Dick Schumacher of Van Nuys, CA. At the time, Dick was a nationally known R/Cer. The Belle was a fun design by a designer normally associated with much more exotic types of aircraft. Not a dedicated competitor, Dick was one of those background people who is very close to the leading edge of happenings. It's easy to see how this simple, good-flying Liberty Belle has influenced R/C designs to this day.

Suggestions from you continue to indicate a desire (need?) for an OT R/C organization which would organize and channel activities along productive paths.

Lou Foschi of La Verne, CA, writes as an OT R/Cer who's getting back into the scene with an L.W. Rebel. This will be a replica of his original, flown in the '50s with an Ace radio, Bonner escapement and a Fox .15 for power. He has fond memories of the Rebel's flights.

Further, Lou has some ideas for regulating OT R/C models which seems to correlate well with the thinking of others. He suggests that models should follow the original design closely. However, the structure and materials could be modern. Two classes could be used: one could use the OT R/C equipment and engines, the other could use modern radios and engines. Both should maintain original engine size. Control would be by whatever equipment the original used—rudder alone or with engine; rudder, elevator and engine, etc. This is one modeler's food for thought. Do *you* have ideas for us to ponder?

A letter from Lewis Chambers of Macon, GA, shows many of us what our future might be. After 75 years Mr. Chambers is still active in R/C, with a

(Continued on page 92)

### SLIMLINE MUFFLERS



#### SERIES II PITTS STYLE MUFFLER

- Quiet • Full Power Range • Bolt-On Or Strap On
- Low Restriction • Machined To Fit Your Specific Engine
- Constructed Of 6061 T6 Alum • Superior Craftmanship

FREE P.O. Box 3295, Dept. 1  
CATALOG Scottsdale, AZ 85257

### INTRODUCING OUR SMALLEST ACCOMPLISHMENT IN 70 YEARS



For over 70 years, Stitt Spark plug company has specialized in manufacturing the world's largest spark plugs for the world's largest engines. Now we've applied the same technology and precision engineering to create the ultimate micro-spark plug. Unlike conventional model engine plugs, Stitt's 1/4"-32 thread M-80 is 100% gas-tight for long-term, high performance in both 2-stroke and 4-stroke model engines fueled by either methanol or gasoline based fuels.

# STITT

Stitt Spark Plug Company  
P.O. Box 327  
Conroe, TX 77305  
Telex: 791219 STITTCROE

Call our TOLL FREE number today for the distributor near you. 1-800-231-8006/8007



## GOLDEN AGE

(Continued from page 90)

fleet of two dozen models which includes many *original* OTers as well as a variety of modern types. He sent us a number of photos which we'll be happy to share with you from time to time.

Already a modeler, Lewis was bitten by the R/C bug while watching Dr. Good perform with his Rudder Bug at the 1949 Nats. Lewis just *had* to have one as his first R/C plane, and he flew it with a Citizenship radio, and Forester .29 for power. Successful, he went on to win the R/C event in several Southeastern regional meets. Doing his share, he also served as AMA V.P. in his district. Mr. Chambers explains that without R/C, life would never have been as complete for him as it continues to be.

There are probably very few modelers who can field such a varied fleet of OT R/C models as Mr. Chambers can. The photo shows a most unusual variety of original, early R/C designs. Can you identify these? Rear row, left to right: Live-Wire Cruiser; a Charger which was a popular rudder only, liked for contest maneuverability; a Wildfire biplane which was kitted by Technical Model Products;

a rudder, elevator-controlled .15-powered fun flyer of the '50s.

Front row, left to right: Just visible is a latter-day Kazmirski Taurus; next, a Live-Wire "champion" flying since 1955 (now powered with a Saito .45 as Mr. Chambers uses it to train newcomers). Next-to-last is a Snapdragon 44 which was a kit by Blackwell Models, Cannon City, CO (another single-channel to which elevators have been added). Power is an OT Taifun .09 diesel which has an FF-style timer to limit the engine run—no throttle! The last model in the photo is called "UFO" by Mr. Chambers because he can't recall what it is! He hopes that someone will recognize it. The span is 36 inches, it's .049 powered and it was built in 1957. Could it be one of Bill Winter's many published designs? What do you think?

Mr. Chambers' fleet represents a lifetime of R/C! Note how practical he's been with all his models. The engines and fuel tanks are never enclosed; wonder if he gleaned that idea from the Smog Hog?

To close this month, Bernard Imhoff of Skokie, IL, writes for advice about his new Live Wire Trainer. His problems are interesting because they relate to applying modern concepts to *very early* OT R/C

designs. Such changes may not mix well because of the aerodynamic objectives involved.

The smallish L.W. trainer was designed around a .09 engine and heavy R/C gear. It flew at a slow speed on its wing and was intended to be guided, not maneuvered. It was successful at the time because of the lack of R/C knowledge by general modelers. Any modeler could get R/C flights without an instructor. Models were hand-launched and if they could be guided in large circles and *brought back* in to land, *that* would be success!

Bernie's modern trainer is powered with a K&B .20, of probably three times the .09 power. It uses an Airtronics radio of about half the original weight. This is great for a modern fun flyer. He complains that his trainer won't take off. Once in the air, it *does* cruise nicely by itself but goes wild when control is applied. He also *doubled* the size of the original rudder.

The trainer's landing gear location was for landing protection only, as takeoffs weren't attempted. With the K&B power it probably would take off if the gear was moved back 1½ inches or so.

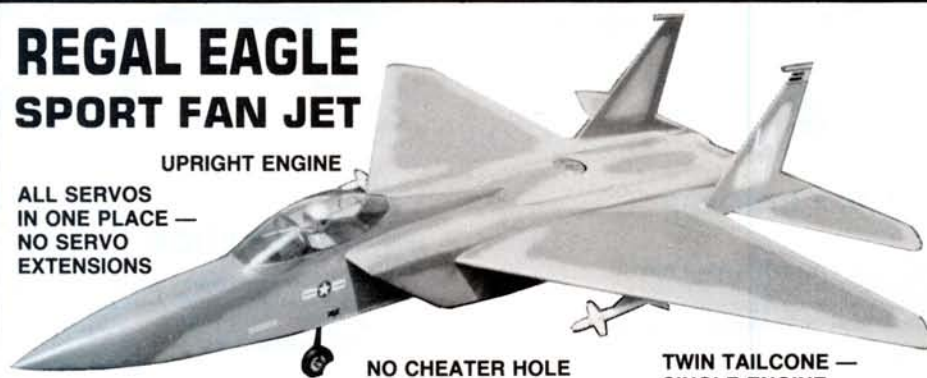
Bernie's trainer is much lighter than he intended, probably much more responsive and has added power. To cure the control

(Continued on page 95)

## REGAL EAGLE SPORT FAN JET

UPRIGHT ENGINE

ALL SERVOS  
IN ONE PLACE —  
NO SERVO  
EXTENSIONS



NO CHEATER HOLE

TWIN TAILCONE —  
SINGLE ENGINE

**AT LAST!  
HASSLE-FREE FAN JET  
FLYING AT A PRICE  
YOU CAN AFFORD**

**\$179.00  
U.S.**

Wingspan ..... 53 inches  
Length ..... 65 inches  
Weight ..... 8 lbs.  
Engine ..... .61-.81  
Fan Unit ..... Byron or any  
Radio ..... 4 channel  
(5 w/retracts)  
Approx. building time ..... 30 hours  
(up to painting)

Take off in 60 feet with a sport .61 engine on any grass field where you would fly a sport propeller plane. Or, install a .77 to .81 and gravity will not exist for the REGAL EAGLE. At 1.37 to 1 thrust to weight ratio, take off and accelerate straight up. This unique design is fully aerobatic within the perimeters of a small flying field and grooves at half throttle like it's on a railway track. Dead stick landing? No problem — the REGAL EAGLE will glide in better than your favorite trainer.

Kit features lightweight balsa construction, pre-cut and interlocking for mistake proof building. Fiberglass parts supplied save hours of carving. Clear canopy. Machine cut foam wing cores. Full size plans and instructions.

Expensive accessories? If you have flown any 4 channel, .60 size 2-cycle airplane, you have all the equipment necessary to build and fly the REGAL EAGLE, with the addition of the least expensive fan unit available.

Sound too good to be true? That's one reason we have prepared a video (at nominal cost) showing step by step instructions from the first glue joint to flying the REGAL EAGLE off the typical grass field. If you want a fan jet, but were put off by the technical jargon and high-priced temperamental equipment previously needed for fan-jet flying, the REGAL EAGLE is for you.

Video (with kit) \$15.00

Video (alone) \$20.00

(VHS Only)

Shipping and handling — Kit \$15.00

Video alone \$4.00

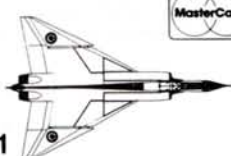
See our BLUE HORNET on page 19

Dealer inquiries invited

**BOB PARKINSON FLYING MODELS**

**HOME OF THE ARROW**

3 William St., Thornton, Ontario L0L 2N0 Canada (705) 458-4391



NEW  
LOCATION



problem, he could try to drastically reduce control action. Use little control and perhaps 1/2 power; then look for the original style flight envelope. Once successful, he could then try adding power and control gradually until he gets a desirable flight.

We see that very early R/C designs weren't intended to fly as we fly today; later designs would fit that bill. In choosing an OT R/C design first understand what it was intended to do, and then stay within its capabilities. Often, modern practices won't be possible without major modifications. Alternatively, you could decide what type of flight you'd like, and then choose an OT R/C design to suit your needs. There are OT R/C designs which can fill most modern needs, and you'll find them by studying their history. They're oldies, but goodies!

## SAITO FA-45 MKII

(Continued from page 55)

the head, the designer is less restricted in the manner that he disposes his inlet and exhaust ports, ignition plug, etc. Thus, with the Mk.II, the inlet pipe plugs into

the rear of the head and directly into the port that leads straight to the inlet valve, whereas in the original FA-45 the inlet port was at the side of the head between two of the head retaining screws, and this involved the use of an external fitting and a 90-degree change of direction for the gas flow.

Other modifications to the Mk.II include a conventional crankshaft that dispenses with the additional brass counterweight of the original FA-45 shaft. The shaft is, of course, supported in two ball bearings and carries the timing pinion in

the form of a splined sleeve keyed in position between the two bearings. As before, the timing gear and two cams are assembled on a bronze bush that rotates on a fixed 4mm-diameter steel shaft.

In place of the machined-bar-stock ringless piston of the FA-45, the Mk.II's piston is machined from a diecasting and has a single 1.0mm-deep unpinched compression ring. It's coupled to an identical conrod, which is bronze-bushed at both ends by a 5mm o.d. tubular wristpin. One of the piston bosses is shouldered to

(Continued on page 98)

## TWO CYCLE AND FOUR CYCLE ENGINE MOUNTS

DRILLED AND TAPPED TWO CYCLE ENGINE MOUNTS			DRILLED AND TAPPED FOUR CYCLE ENGINE MOUNTS		
JT-E40	ENYA 40SS-45CX	10.00	JT-42	ENYA 35-40 4C	10.00
JT-F40	FOX 40 88 DELUXE	10.00	JT-46	ENYA 46 4C	10.00
JT-KB20	K & B R/C Sportster	8.00	JT-64	ENYA 60-80-90-120 4C	13.00
JT-KB45	K & B R/C Sportster	10.00	JT-121	ENYA "R" 120 4C	20.00
JT-KB60	K & B R/C Sportster	12.00	JT-41	HP VT 21	10.00
JT-IV20	IRVINE 20-25 R/C	8.00	JT-49	HP VT 49	13.00
JT-IV30	IRVINE 30-40 R/C	9.00	JT-20	MAX FS 20	8.00
JT-IV61	IRVINE 61 R/C	12.00	JT-44	MAX FS 40-40 Surpass	10.00
JT-M20	MAX 20-25 FP	8.00	JT-48	MAX FS 48 Surpass	10.00
JT-M25	MAX 25 FSR	8.00	JT-61	MAX FS 61-61 Surpass	13.00
JT-M35	MAX 35-40 FP	10.00	JT-62	MAX FS 60-75-90	13.00
JT-M40	MAX 40 FSR	10.00	JT-122	MAX 120-120 Surpass	20.00
JT-M46	MAX 40SF-46SF	10.00	JT-43	SAITO FA 30	10.00
JT-M50	MAX 50 FSR	12.00	JT-45	SAITO FA 40-45	10.00
JT-M61	MAX 61 FSR-61 SF	12.00	JT-65	SAITO FA 65	13.00
JT-M108	MAX 91-108 FSR	18.00	JT-123	SAITO FA 120	20.00
JT-B21	ST-BRAT 21-25-29	8.00	UNDRILLED MOUNTS		
JT-ST40	ST-COMO 40-45-46	10.00	JT-20	Average 19-25 disp.	8.00
JT-ST51	ST-COMO 51-60	12.00	JT-40	Average 29-45 disp.	8.00
JT-ST61	ST-COMO 61-75-90	12.00	JT-60	Average 50-60 disp.	11.00
JT-ST3000	ST 2000-2500-3000	20.00	JT-120	Average 90-120 disp.	16.00
PYLON RACING MOUNTS					
JT-15PY	15 disp.	6.00			
JT-40PY	40 disp.	8.00			



CAST ALUMINUM

If not available at your hobby shop,  
ORDER DIRECT for immediate shipment.  
Check, M.O. Visa, MC or COD accepted.  
Add \$2.50 for UPS; \$2.00 for COD; as 6%  
sales tax for Calif. resident.

**J'TEC**  
164 School St.  
Daly City, CA 94014  
(415) 756-3400

FREE CATALOG

## A Special Message TO RETAILERS!



**I**MAGINE the benefits of drawing many more regular customers into your store every month. Imagine adding a popular, **profitable**—and returnable—hobby product to your store. By stocking **Model Airplane News**, **Radio Control Car Action**, and **American Boat Modeler** you'll accomplish both! These are the most informative and entertaining modeling magazines available to the R/C consumer—and they're in tremendous demand. These magazines will actually stimulate more sales of R/C Airplanes, Cars, Boats and accessories for you.

If you're not already stocking Air Age magazines, please call us toll-free and we'll let you know how they can make money for you.

Call Yvonne Toll-Free at

**1-800-243-6685**

(in CT 203-834-2900)

(dealer inquiries only)

Air Age Publishing • 632 Danbury Road • Wilton, CT 06897



# PRACTICAL SIZED GIANT SCALE MODEL PLANS

Fiberglass Cowlings and Canopies Available



Span 77"

DC-3	1 1/2" = 1"	140" Span	\$42.00
F4U "CORSAIR"	2 1/4" = 1"	93" Span	\$30.00
A6M5 "ZERO"	2 1/2" = 1"	91" Span	\$30.00
CURTIS "P40"	2 1/2" = 1"	94" Span	\$30.00
AT-6 "TEXAN"	2.4" = 1"	101" Span	\$30.00
F8F "BEARCAT"	2 1/2" = 1"	86" Span	\$30.00
FOKKER "DR-1"	2.7" = 1"	63" Tripe	\$27.00

## NEW 1/5 - STEARMAN \$27.00



Send \$2.00 for

Catalog of Plans, Accessories and Supplies  
Credited to First Order of \$25 or More



F-15

Plans For RK-20 or  
RK-740 Ducted Fans

Phantom	35" Span	\$10.00
Viggen	32" Span	\$10.00
F-15	36" Span	\$10.00
Plan and Canopy		\$15.00

Order From:

**Nick Zioli**

29 Edgar Dr., Smithtown, NY 11787, U.S.A.

516-234-5038

## SAITO FA-45 MKII

(Continued from page 95)

contain axial movement of the wristpin in one direction, while the other end of the

pin is fitted with a flat disc-type PTFE pad to prevent it scoring the cylinder wall.

The valves and valve gear are unchanged. A check on valve timing indicated a slightly shorter inlet period (approx-

imately 255 degrees) and longer exhaust period (approximately 285 degrees) than the Mk.I but, as such variation is quite common with the tiny cams of model 4-strokes, it isn't known whether these differences are intentional or whether they come within the normal production tolerances for this engine. The Mk.II's compression ratio checked out at approximately 6.5:1 compared with 7.2:1 for the Mk.I test model.

The Mk.II version of the Saito FA-45, like its predecessor, isn't supplied with a muffler but comes with an exhaust pipe whose outlet is restricted to 5mm i.d. to help reduce noise levels. The carburetor, as before, is a barrel throttle type, with a second needle for adjusting the idle mixture, and also provides automatic mixture control at mid-range speeds. The Saito FA-45 Mk.I was the first model aircraft 4-stroke engine to be equipped with a choking device. This, continued on the FA-45 Mk.II, is of the non-self-reopening slide valve type.

At a checked weight of 415 grams (14.6 ounces), the Mk.II is just over 1/2 ounce heavier than its predecessor but is still of moderate weight for a .45-cubic-inch 4-stroke motor.

(Continued on page 106)

## SIX SHOOTER FUEL PUMP

NOW AVAILABLE FOR GASOLINE & DIESEL FUEL

APPROX. .6 oz.  
per revolution



HAND CRANKED  
FOR SAFE  
RELIABLE USE

EITHER  
VERSION  
\$10.95

THE ONLY  
PUMP AVAILABLE  
FOR USE WITH  
DIESEL FUEL

SEE YOUR DEALER OR DISTRIBUTOR

**DAVE BROWN PRODUCTS**

4560 LAYHIGH RD., HAMILTON, OH 45013 — (513) 738-1576

## Technopower's

## NEW BIG BORE 7

- Cast Iron Piston Rings
- 14x6—16x8 Prop Range
- Extra Heavy Crank Shaft Supported By Ball Bearings Fore and Aft
- Phosphor Bronze Valve Guide
- Master Rod Runs on Needle Bearings
- Rocker Boxes are Investment Cast—Balance of Engine is Bar Stock
- Hardened and Ground Steel Cams
- Hardened and Centerless Ground Valves
- Weight: 30 1/2 oz

- 7 Cylinder
- 4 Cycle
- Overhead Valves
- Glow Ignition
- Displacement 2.0 cu in.

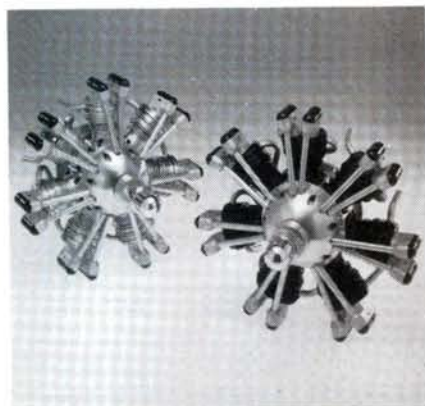
- Red Line rpm 9000
- Flying rpm 8500
- 6 1/8-in. Diameter
- Hard Chrome Bore

TECHNOPOWER II INC.



Send \$3 for catalog.

610 North Street • Chagrin Falls, OH 44022 • 216-564-9787





# Product News

Descriptions of new products appearing in these pages were derived from press releases by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by **Model Airplane News**, or guarantee of performance by **Model Airplane News**. When writing to the manufacturer about any product described here, be sure to mention that you read about it in **Model Airplane News**.



## GREAT PLANES

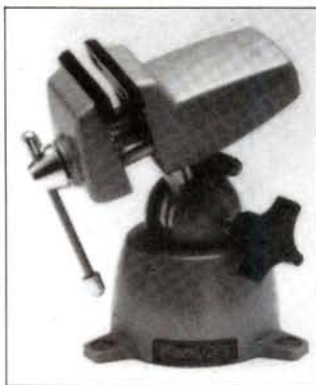
In response to numerous requests from free-flight and nostalgia buffs, Irvine Engines has begun a limited production run of a replica of the Mills .75cc Diesel engine. Based on the original engine from the late 1950s, the Irvine Mills .75cc Diesel features a machined steel backplate, aluminum spinner and a long, fuel-efficient needle valve. It uses inexpensive diesel fuel, so it's extremely smooth and powerful. It's also very easy to start and runs great!



The new O.S. .40 SF and .46 SF are the latest in the series of SF engines. Designed as replacements to the .40 and .45 FSR engines, the .40 and .46 SFs boast improved performance and reliability. These SF engines feature Schneurle porting, a ball bearing-supported crankshaft and a specially designed large-throat 4D carb. There are also ABC versions of these engines available.



The Hobbico Deluxe Power Panel enables you to power your electric starter, fuel pump (either 6V or 12V) and glow plug clip from just one source! Its 6x3 3/4-inch size will fit conveniently into most field box designs. This power panel also has adjustable glow plug current (with true pulsed power) and an ammeter to check for burned-out glow plugs and engine problems. Includes all necessary accessories. For more information contact Great Planes Model Distributors (P.O. Box 4021, Champaign, IL 61820).



## STANDARD VISE

The most popular combination in the Panavise product line—the Model 301 Standard Panavise—is an all-purpose work-holding unit. Sold complete with standard head, base and nylon jaws, the Standard Panavise tilts, turns and rotates work through three planes. The Standard Head opens to 2 1/4 inches, while additional accessory jaws for the Standard Head are also available in high-heat Teflon, grooved nylon, brass and plated steel. For more information contact Panavise Products, Inc., 2850 East 29th St., Long Beach, CA 90806.



## 60 HELICOPTER ENGINE

For the R/C helicopter enthusiast who wants only the finest, the YS/Futaba 60F-H helicopter engine is a virtually hand-built version of YS/Futaba's legendary aircraft 60s. Features include material and machining quality and YS/Futaba's unique, variable pressurization system. Coupled to the YS integrated carburetion design, fuel flow is continuously and automatically regulated for superior throttle response when hovering. Performance is not affected by tank position or fuel level during rolls, loops or inverted flight. It's available in both side and rear exhaust configurations. For more information contact Futaba Corporation of America, 555 West Victoria St., Compton, CA 90220.



## SUNBIRD SPORT PLANE

The new Sunbird from GM Precision Products is a great-flying sport plane that will turn heads while it's in the air as well as while on the flightline. The kit includes the finest hand-selected wood and precision-machined parts as well as detailed plans and instructions. The Sunbird has a wingspan of 52 inches, a wing area of 572 square inches, a flying weight of 4 1/2 pounds, and uses a .40 to .45 2-stroke engine. The Sunbird is also available in a .10-size version with a 37 1/2-inch wingspan. For more information contact GM Precision Products, Inc., 510 Arrow Highway, San Dimas, CA 91773.





### A.S.P. ENGINES

World Engines is proud to announce the introduction of the new A.S.P. engines from China. These engines seem to have the most reliable performance of any engines on the market. This performance is made possible by the high quality of engineering on the inside of the engine. ABC piston/cylinder assemblies, which are used in the A.S.P. engines, provide very high compression. The crankcase is Schneurle-ported and the crankshaft is supported by precision ball bearings which are capable of handling high speeds. Other factors that contribute to the high performance of these engines are the mirror-polished crankshaft and the smooth finish on the inside of the crankcase. For more information contact World Engines, Inc., 8960 Rossash Rd., Cincinnati, OH 45236.



### ELECTRIC EAGLET

Leisure's easy-to-build scale model kit of the American Eaglet is electric powered and shares the gentle flight characteristics of the full-scale aircraft. Scaled to 1.8 inches equals 1 foot, the model has a wingspan of 62 inches and a wing area of 571 square inches. Its lightweight structure (40 to 41 ounces flying weight) allows a low-wing loading of only 10.4 ounces per square foot. When combined with a Leisure flight system (No. 603A:05, LT 50, modified motor geared 2.5-to-1 and a 7-cell 800mAh battery pack) turning a 11x5 prop, flight performance is spectacular. For more information contact Leisure Electronics, Inc., 22971 "B" Triton Way, Laguna Hills, CA 92653..



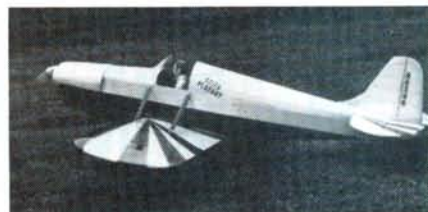
### P-51 MUSTANG

The newest entry into the 90-size category is the D&R Aircraft Sport-Scale P-51 Mustang. The P-51 features a wingspan of 75 inches, a wing area of 1,050 square inches, and a total weight of about 10 pounds. With a .90-size 2-cycle engine or a 120-size 4-cycle, this Mustang will really step out! Take-offs are straight and quick, with little or no rudder. When landing the D&R Mustang, the semi-symmetrical wing and the flaps to prevent tip stalls make landing a breeze. The deluxe kit includes all hardware, fiber glass cowl, and all decals. For more information contact D&R Aircraft Manufacturing, P.O. Box 23056, Austin, TX 78736.



### BELT TAIL-DRIVE

The new Toothed-Belt Tail-Drive System from Circus Hobbies is designed by helicopter experts to suit the needs of the "Hot Dog" flyers who demand higher performance from their Kalt Cyclone helicopters. This Toothed-Belt Tail-Drive System easily replaces the main- and tail-belt pulleys on Cyclones without autorotation, and requires no prior modifications to be installed in one hour. The main toothed-belt pulley is constructed of high-quality steel, and the toothed drive-belt is composed of fiber-reinforced quality rubber that offers the most reliable, positive-reaction drive system available. For more information contact Circus Hobbies, 3132 South Highland Dr., Las Vegas, NV 89109.



### 1/3-SCALE STITS PLAYBOY

The latest release from D.G.A. Designs is the 1/3-scale Stits Playboy. This sport-scale design has an 88-inch wingspan, 1,584 inches of wing area, and can be powered by a Q35 engine or something similar. The design features a one-piece wing which allows for quick field set up. Primary construction materials are basswood, balsa and plywood. Fiber glass wheel pants and cowl are available from T&D Specialties. The flight characteristics will please the average Sunday pilot and the local airborne hot-shot. Plans come in a sturdy shipping tube and include several pages of building instructions. For more information contact D.G.A. Designs, 135 East Main St., Phelps, NY 14532.



### RECRUIT TRAINER

The Recruit is a high-wing cabin design with generous moments and areas that make it a true .40-size trainer. It has slow and stable flight characteristics combined with a good rate of climb. These features give the student ample reaction time for control, and improved visibility for orientation. The Recruit has a wingspan of 64 inches, a wing area of 778 square inches, a fuselage length of 49 inches and a weight of 6 to 6½ pounds. The kit includes complete hardware, quality balsa and plywood materials, formed dural main gear, pre-bent steerable nose gear, two sheets of rolled plans, and a photo-illustrated instruction manual. It requires a .35 to .45 2-stroke or .46 to .61 4-stroke engine and a 3- to 4-channel radio. For more information contact Aerocraft, P.O. Box 553, East Northport, NY 11731.





## BUILD YOUR OWN ROCKET MOTORS! WE CAN SHOW YOU HOW!

- 40 POUNDS THRUST!
- 50¢ EACH!

• With a rock tumbler and some simple hand tools, we'll show you how to build **YOUR OWN** rocket engines in your own garage or workshop for 1/5 to 1/10 the cost of the commercially marketed motors.

• **INTERESTED?** Just send us \$2.00 and we'll mail you our brochure along with a **WORKING SAMPLE** of an electric igniter that **YOU CAN MAKE YOURSELF** from materials you'll find around the house.

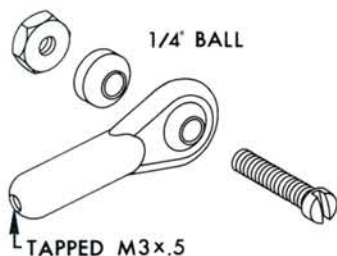
**TELL YOUR FRIENDS ABOUT US!** We're the **DO IT YOURSELF ROCKET** people.

Write to:

The Teleflite Corporation  
Department MN03  
11620 Kitching Street  
Sunnymead, CA 92388

## ROCKET CITY SPECIALTIES

NEW



### METRIC BALL LINK

This BALL LINK will fit your M3 threaded tie rods. BULK PACKS of 100 each available 25 - 30% savings. 121 BALL and SHANK combination.

STOCK #87B M3 2-SETS..... \$2.40  
w/M3 hardware



See your DEALER or order direct  
ADD .50¢ for postage and handling.  
Catalog sent post paid.

103 Wholesale Avenue N.E.  
Huntsville, Alabama 35811  
Phone 205/539-8358

## SAITO FA-45 MKII

(Continued from page 98)

When we dynamometer-tested the FA-45 Mk.I, a peak power output of 0.51 bhp at 11,400rpm was obtained, but perhaps more significant was its useful torque at lower speeds, enabling it to cope with the larger props (12- to 14-inch diameter of low to medium pitch) that are particularly useful for scale models. By more recent standards, the FA-45's specific output of 1.12bhp/cubic inch indicates a relatively lightly stressed engine, and this was reflected in easy handling and pleasant running qualities, including a complete lack of any tendency to detonate (note the engine's low compression ratio). The Mk.I came through a long test session in a clean and unmarked condition, in contrast to some more powerful, modern 4-strokes which, with the higher specific power outputs now being realized, are beginning to bear the marks of a more hectic life.

All in all, the FA-45 Mk.I emerged as an enjoyable sport-type 4-cycle engine and we're glad to see that the Mk.II is well qualified to continue in this tradition.

### Attention Engine Collectors

Engine connoisseurs who remember our now-defunct long-running "Foreign Notes" (later renamed "Foreign News") column in *MAN* may recall that we occasionally reported on the remarkable home-built engines of the Dutch expert Wim van der Hoek. Wim specializes in multicylinder, 4-cycle motors and, among many splendid achievements mentioned, were a horizontally opposed 4-cylinder, a 5-cylinder radial and, most exotic of all, a 3.3-cubic-inch overhead-camshaft V12.

Last August, Wim attended the FAI World R/C Championships at Avignon in the South of France, taking with him a new 4-cylinder, 4-stroke engine. Here he suffered the misfortune of having the engine and other valuables stolen when thieves broke into his car while it was parked in Caumon-sur-Durance.

It's just possible that the thieves may try to sell the engine to a modeler, or that it may eventually find its way to the engine collectors' market. Wim is therefore appealing to engine enthusiasts to contact him if any evidence of the whereabouts of the engine should come to light. His address is: Wim van der Hoek, Violierstraat 23, 3073 TS Rotterdam, Holland. Alternatively, any report may be sent to the Netherlands Royal Aero Club, Josef Israelsplein 8, 2596 AS 's-Gravenhage, Holland.

The engine, a "one-off," is a rare type and could not be confused with any

current commercial production model. It has four in-line, air-cooled cylinders totaling 20cc (1.2 cubic inches) displacement and features an enclosed overhead camshaft and spark ignition. It has a long cylindrical muffler with four angled outlet stubs located on the right-hand side of the engine in line with the base of the cylinders. Above the muffler are two carburetors, each feeding a pair of cylinders via Y-branch manifolds. When stolen, the engine had an identification No: 20 12 85 on the right-hand side of the crankcase towards the rear, and it was bolted to a black, welded-steel firewall mount on a large wooden base approximately 35x40cm (about 14x16 inches).

Some 2,000 hours of Wim's time went into the design and construction of this engine, and that says it all.

**ERRATA:** Six words were omitted from our write-up on the O.S. FS-120S in the October 1987 issue of *MAN* and, as a result, the sentence involved doesn't make sense. Page 99, first column, fifth line up from the bottom. After the word "valves," sticklers for accuracy should insert a comma and the following: "the new engine uses vertical valves."

## X-CELL 60

(Continued from page 63)

including the nuts and bolts.

The parts which are not bagged, e.g., the sideframes, are wrapped in tissue paper for their protection.

The 40-page instruction manual is very comprehensive. To the experienced helicopter builder it might seem very long-winded. However, there's a good reason for this. The manual was written so that a first-time builder will have no trouble correctly assembling and setting up the X-Cell. A word of caution: Even an experienced builder should read the manual carefully. I know of several experienced helicopter fliers who've had various problems with the X-Cell because they didn't follow the instructions carefully.

In addition to the instruction manual, there are two large, detailed sheets of diagrams illustrating each construction step.

If the manual is followed carefully there should be few, if any, problems building the X-Cell. However, should any problem arise, a call to Walt Schoonard or one of his sons will bring a speedy solution.

Since the manual is well detailed there's no need to repeat information here, so I'll clarify only certain areas.



All of the steel parts in X-Cell have been treated at the factory with an oil-based protectant to prevent rust. The protectant will not allow the Loctite to work properly so it must be removed with a solvent such as acetone, alcohol or lacquer thinner.

When installing the Hexballs, care must be taken so that the ball is threaded in straight. I found that a long-handled 1.5mm wrench was much easier to use than the small-angle Allen wrenches which most people own. A long-handled Allen wrench is well worth the investment, and such a wrench is available from MA/USA, part No. 4651, and also from Du-Bro\*. Be careful when tightening the Hexballs so that the composite threads are not stripped out.

The tail rotor drive wire runs in a long bearing tube supported in the tail boom by molded plastic guides. The brass bearing tube must be roughened with fine sandpaper so that glue will stick to it. Use gap-filling cyanoacrylate and build up a good fillet of glue. Having the bearing tube slip can cause problems, so do it right the first time.

Pay special attention to adjusting the main/tail rotor drive gear mesh. This adjustment is critical for long gear life.

The tail rotor output transmission must be aligned exactly parallel with the main drive gear. This is easy to achieve if the output transmission is aligned with the installed tail tube and drive shaft.

The elevator bellcrank will fit very

snugly on the shaft. This is normal and the shaft will loosen up in the bellcrank during the first flight. Don't loosen it during installation. The elevator servo is mounted behind the main shaft on the X-Cell. When installing the servo, test-fit

## We don't like to brag but...



We have the only paint that goes on styrofoam, mylar, fabric, wood, metal, fiberglass, and plastic. We offer more sizes, more accurate computer matched colors, high pigment content, and our high gloss finish outlasts and outshines all the others.

We don't like to brag... BUT WE DO... by putting a large paint chip on every can of PERFECT PAINT.

**cheveron hobby products**

P.O. Box 2480 • Sandusky, Ohio 44870  
Ph. 419 627-1877

**COMPLETE  
LINE OF  
STANDARD & METRIC  
SIZES!**

# Hobby Hardware



- Full line of Standard and Metric Sizes
- Hard to find 1/4 Scale hardware
- Only the finest industrial grade materials
- FREE shipping on Pre-paid orders
- Monthly Specials
- Packaged in convenient quantities
- Club discounts available

**Quality doesn't have to cost a fortune.**

Call or Write for complete catalog.

**Hobby  
Hardware**

2738 S. Paseo Loma, Mesa, AZ 85202

602/838-2085

**SPECIAL PRICES GUARANTEED  
TO END OF ISSUE MONTH**

### SOCKET HEAD CAP SCREWS

25	4-40 X 1/2	\$1.35
25	4-40 X 3/4	\$1.35
25	6-32 X 1	\$1.35
25	8-32 X 1	\$1.35

### METRIC SOCKET CAP SCREWS

10	3mm x 10mm	\$1.45
10	3mm x 15mm	\$1.45
10	3mm x 20mm	\$1.45
10	3mm x 30mm	\$1.45

### SHEET METAL SCREWS

25	#2 X 3/8	\$1.49
25	#2 X 1/2	\$1.59

### LOCK NUTS

25	4-40	\$1.35
25	6-32	\$1.59



## X-CELL 60

it on both sides of the mounting plate. Permanently mount the servo on the side which gives the pushrod the straightest run to the elevator bellcrank. Secure the

mounting screws with cyanoacrylate for safety, or use small machine screws and lock-nuts. Route the servo wire so that it can't become tangled in the mechanics. Special wire retainers are provided for this purpose.

The Rotorsport main rotor blades supplied with the X-Cell have a symmetrical airfoil and feature super-strong molded urethane blade mounts. Tests have proven this design safe to 2,200 pounds of lateral pull. The weight of the blades has been matched at the factory, so balancing is easy. By the time this article is published, a totally new rotor blade with a pull strength of 3,900 pounds (far exceeding other brands by 2 to 3 times) will be standard.

Just about any 60-size engine can be used in the X-Cell 60. Both side or rear exhaust engines can be fitted. The engine used for this review was the ringed version of the OS Max .61 long-stroke with the remote fuel pump. Available from Great Planes\*, this engine is a solid performer with all the power that the helicopter can use and then some. The pump and the new, two-needle valve-pump carburetor were easy to adjust. The engine has a solid idle and a smooth and linear mid-range and high-end power that are, in a word, awesome! A Miniature Aircraft Magna-Pipe exhaust system was used for this review. The Magna-Pipe is very quiet and is tuned for the extra midrange power which helicopters require.

(Continued on page 110)



### The **POLISHED** Approach to **MONOKOTE®** APPLICATION! The NEW MonoKote® **HOT SOCK™**

A simple, easy-to-use cover for your iron's shoe that virtually eliminates surface scratches. It's a buffer of 100% cotton between the hard shoe of your iron and the mirrorlike finish of MonoKote.

Results? Even easier MonoKote application without hazing or scratches. New life for your old iron shoe. Fantastic on wingtips, solid surfaces ... wherever you cover with MonoKote.

Only from TOP FLITE! Who else?



## IT'S HERE!! The just-released Eleventh Edition of the

### Radio Control Buyers Guide

The Hobbyist's Guide to the World of Radio Control

This latest edition includes:

- Over 3,000 products
- Over 80 categories for easy referencing
- More color than ever
- Special section featuring the Academy of Model Aviation Museum

### THERE'S NO OTHER SOURCE LIKE IT!

Thousands of photos and descriptions for up-to-date information on:

- Aircraft • Cars • Boats • Radios
- Systems • Engines • Hardware • Books
- Finishing Materials • Accessories
- Videos and More • R/C Dealers

If your local hobby shop does not stock copies of the Guide, please send your request with payment of \$14.95 (\$11.95 plus \$3.00 postage / handling) to:

### RADIO CONTROL BUYERS GUIDE

14101 Parke-Long Ct., Suite G, Chantilly, VA 22021

You may use your VISA or MasterCard to charge the payment by sending the card number and expiration date with your order.





# WOW! AN AUTOGIRO!



**NEW!**



Something different! Pitcairn Autogiros were operated by commercial firms and the U.S. Navy during aviation's Golden Age. Kit features: Injection-molded plastic parts • Monofilament rigging • Comprehensive instructions • Civil and military decal markings

SEND \$3 FOR COMPLETE COLOR CATALOG • DEPT. MAN  
181 PAWNEE STREET, SAN MARCOS, CA 92069

## X-CELL 60

(Continued from page 108)

The control system used was the Futaba\* PCM 8 helicopter radio. This radio has all the bells and whistles that make setup and flying a pure joy. The transmit-

ter has so many functions that listing them all would be impractical. There is servo-reversing on all channels and a choice of standard dual rates or non-linear VTR (variable trace ratio) on the rudder, aileron, and elevator. It has sophisticated revolution-mixing compensation

which allows the tail rotor pitch to decrease at high throttle, so minimizing power loss in the tail rotor system. There are two separate high-idle circuits and a throttle hold. The hovering pitch and throttle can be adjusted independently, without affecting the end points of either the pitch or the throttle curves. There are four pitch curve trimmers allowing a wide range of adjustments of both the upright and inverted pitch curves. There are microprocessor-controlled total travel adjustments on all channels. The transmitter has a built-in digital tachometer/timer. There's also a fail-safe system that places the servos at a preset position if the receiver detects a loss of signal. A 1,200mAh battery pack, a Dean's base-loaded antenna and an old Kraft gyro rounded out the guidance system.

A neat little airborne battery tester was also installed. The Planesaver, from SAI\* is a 10-step expanded scale voltmeter which weighs less than one ounce. The Planesaver plugs into any unused channel in the receiver. When the button is pressed, the batteries are tested under a 200mAh load. Each segment of the LED display equals 0.1V and the range is 4.4-5.4V. If there are four or more segments lit, it's

(Continued on page 112)

## Still chiseling slots for hinges?

# WHY?

ROBART Hinge Points are so easy to install. Just drill a hole, follow with a drop of glue and insert Hinge Point. What could be easier? And ROBART Hinge Points are designed to last. No binding and pull proof. For removable control surfaces try our Hinge Point Pockets.

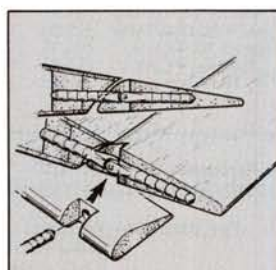
For more hinging solutions ask your dealer for ROBART'S "How To Series" on HINGES.

If you're serious about R/C modeling, look into ROBART'S quality choices.

# 300 Hinge Point  
# 305 1/2A Hinge Point  
# 310 Super Hinge Point

# 315 Hinge Point Pocket  
# 318 Super Hinge Point Pocket

# 302 Horny Hinge Point



**robart**

P.O. Box 1247 • 310 N. 5th St. St. Charles, IL 60174 • (312) 584-7616



## X-CELL 60

(Continued from page 110)

safe to fly. I've been using Planesavers in my other helicopters and airplanes for about three years and I swear by them. Using a Planesaver, it takes only a second to determine if the batteries are strong enough for another flight.

Setting up the X-Cell is very easy since Walt has written a detailed, seven-page section in the manual covering the proper set-up of the machine. Nothing has been left to guesswork; everything is covered—even the setup for inverted flight. I found

the set-up section to be very good, but I increased the pitch capability by making the No. 0337 washout connecting rods 10.5mm long instead of the 8.5mm recommended.

One of the most valuable tools available for the X-Cell is the flybar lock which Miniature Aircraft sells. It's a small piece of aluminum which snaps in between the flybar yoke and a ridge on the main rotor-head block. Once the lock is snapped into place, the flybar is firmly anchored, making pitch and cyclic adjustments much easier and more accurate.

The final pitch settings I arrived at after flying the machine are a low-end pitch of -3 degrees, +4.5 degrees at hover and +9 degrees at the top end. This setup works well at a main rotor speed of 1,550rpm. The collective becomes too jumpy if the rotor speed is over 1,600rpm.

The canopy consists of two vacuum-formed halves of smoke-colored plastic and a plastic latch. The canopy mounting method is unique. The lower part of the canopy is sprung over two posts projecting from the fuel tank mount. The top latch snaps into a hole in the main chassis. This system allows the canopy to pivot forward allowing access to most of the control links without having to completely remove the canopy. I painted my canopy with Pactra\* Formula-U white and trimmed it with the set of decals provided in the kit. I also used some black Mono-Kote trim sheet.

**PERFORMANCE:** After finishing the X-Cell, I went to visit my friend Stan Blum. The following flight review is a combination of our opinions on the X-Cell.

Flying the X-Cell is an absolute joy. The helicopter is rock-steady in hover, so rivaling the multiblade machines, yet it's also very aerobatic. It loops from hover on 60 per cent rates with ease. Rolls can be made very axially. Tail rotor response is strong and crisp. The X-Cell is also very solid in inverted flight and inverted hover. The machine is just as responsive inverted as it is upright. The most impressive characteristic of the X-Cell is its autorotation capability. Even with the stock unweighted blades, autorotation is effortless and requires only a small amount of collective at the end of the flare. The rotor has more than enough extra energy for a short hover at the end of an autorotation.

I only found two faults in the X-Cell 60 kit and both have already been corrected. First, on the early X-Cells, the self-tapping screw that holds the plastic cooling fan to the aluminum hub was too short and didn't grip the hub adequately. After a

## FIBERGLASS PARTS

Over **237** cowls for kit or scratch-built models. Also over **34** round cowls, ranging from 4" to 14 7/8" diameter and **55** different size and shape wheelpants.

We custom-make parts and vacuum form canopies



Please send \$1.00 for complete list.



### T&D FIBERGLASS SPECIALTIES

30925 Block, Dept. 4, Garden City, MI 48135

Phone (313) 421-6358

Brazed & Heat-Treated Wire Gears & Cabanes

Phone (313) 261-9064

## IMMORTAL EAGLES



SEND \$3.00  
For 12 page  
catalog. 47  
Planes, Prints,  
Frames, Mats

SEND  
TO: NOSTALG-Air P.O. Box 8510  
Michigan City, Indiana 46360

## SUPERB Pen & Ink Prints

## INSTANT TEMPLATES

See Temp is a special soft mix of vinyl, calendered on both sides. It is .015-inch thick for rigidity and sized 21 1/2 x 51 1/2", large enough for most projects, or tape two pieces together. It will not crack or shatter. A frosty finish prevents glare or distortion.

It's easy and quick. Lay See Temp over plan, score with a modeling knife, and break on score line. Templates are permanent and can be labeled for filing.

It's see-through.

You get it right the first time!

<b>SEE</b>	1 sh.—\$ 5.50 ppd.
<b>TEMP.</b>	2 sh.—\$10.00 ppd.
<b>P.O. BOX 105</b>	3 sh.—\$15.00 ppd.
<b>SUSSEX, WI. 53089</b>	4 sh.—\$20.00 ppd.
	5 sh.—\$22.00 ppd.

## Ducted Fan Balsa Kits



Nick Zirilli F-4 Phantom \$99.95  
Nick Zirilli F-15 \$99.95  
Aerojet 25 Fan \$59.95

**Southeast Model Products**  
14325 60th St. North  
Clearwater, FL 34620  
813-530-5155  
VISA & MC Accepted

few flights, the screw developed a tendency to fall out, allowing the fan to slide down the hub. This problem was solved by the use of longer screws. The earlier fans can be used if a longer screw is substituted. I tapped the hole for a 1/32 machine screw and glued it in with cyanoacrylate. All future kits will have a unique knurled fan hub. The knurling will be opposite to the direction of rotation, causing the fan to tighten under use. Along with the knurling, two screws and an assembly resin will provide an extremely reliable system.

The other problem was that, on the X-Cell 60, the tail rotor and the lower portion of the vertical tail fin were the same length, so allowing the tail rotor to strike the ground too easily. This problem was compounded by a general lack of tail rotor ground clearance. Walt is now producing a fin for the X-Cell 60 with a longer lower projection. This fin is now standard in all X-cell 60 kits.

If the X-Cell is flown off a relatively smooth surface, the new fin is the only correction needed. For others, like me, who fly off uneven ground or out of tall grass, additional ground clearance is needed. This can easily be accomplished by placing spacers between the landing gear and the sideframes on the rear bolts only. I used the 1/4-inch spacers which come with Miniature Aircraft's Tuf-Strut I landing gear. This gives ample clearance for most flying fields.

I've also found that on a moderately hard tail boom strike, the plastic fittings at the ends of the aluminum tail boom support can pull out even if they were well glued, so I've pinned them with a small screw.

There are several accessories available for the X-Cell from Miniature Aircraft. There is a machined aluminum button which glues into an existing hole in the top of the main rotor head block. An



## JET ENGINES

- Miniature turbines • Military surplus
- Pulse jets • Ramjets • Kits
- Plans • Pen Pals

**DYNAJETS**  
**\$195**

**NEWSLETTER \$12.00**  
**CATALOG \$5.00**

**AL DOYLE**

4015 San Jacinto #404A  
Houston, TX 77004

aluminum cone start extension is also available. This self-aligning start adapter easily bolts onto most electric starters, and the rubber insert is designed to fit the X-Cell's start cone perfectly, thereby eliminating the tendency to jump off during use.

In conclusion: The X-Cell may be the best machine currently on the market, and I expect to see it in the winner's circle many times during the next year.

If you decide to purchase an X-Cell, send in the warranty card immediately so that MA/USA can keep you informed on any updates or safety additions.

*\*The following are the addresses of the companies mentioned in this article:*

Miniature Aircraft USA, 2394 Orange Blossom Trail, Orlando, FL 32804.

Du-Bro Products, 480 Bonner Rd., Wauconda, IL 60084.

Great Planes Model Dist., P.O. Box 4021, Champaign, IL 61820.

Futaba Corporation of America, 555 W. Victoria St., Compton, CA 90220.

SAI, 27107 Richmond Hill Rd., Conifer, CO 80433.

Pactra (Plasti-Kote), 410 N. Michigan Ave., RM 1280, Chicago, IL 60611. ■

## SUPER RIETI

(Continued from page 66)

glued together there is a slight pressure that bows the nylon insert, and the blades will no longer go into the box. I took a Dremel tool with a grinding wheel to the blades, and slowly removed enough material to make them fit. I don't know any other solution. I couldn't risk opening up the nylon inserts because it's essential that the blades fit tightly into the boxes.

The wing is then cut for the spar assembly which is epoxied in place. Then the pre-formed plastic root rib is glued in place. The ailerons come partially cut out, and just need to be freed with a couple of saw cuts and then faced with balsa. The

ailerons are then drilled for the flex pin hinges (similar to Robart pin hinges) which hold very well in the foam. The aileron pushrod is a very flexible cable that runs down the front of the wing and is glued in place just before applying the leading edge. When inserting the pushrod plastic sheath, it's very important not to make too sharp a bend, as one servo must drive both ailerons.

The dive brakes are also partially cut out and, once removed from the wing, they are faced with balsa. This is where more of the clever hardware and linkages come into play. The dive brakes are hinged from each end with a pinned tube hinge allowing them to swing up and forward. The end of the tube has a square cap on it which fits into the aileron horn when the wing is plugged onto the fuselage. The brakes are about 2 inches deep and 7½ inches long, and are very effective. The wing tips are simply finished with an angled piece of plywood which is sanded to the profile of the tip airfoil.

The final step in the wing assembly is the rather unusual wing securing system. There are no rubber bands or springs holding the wing in place. Instead, the wings have a large nylon stake which should be glued into each wing root. The right panel then has a hook screwed into the nylon stake which has a threaded nylon shaft attached to it. The left panel has a knurled receptacle attached to its nylon stake. When the wings are on the fuselage, the threaded shaft goes into the opposing coupler and is tightened by turning it until the wings are rigidly attached to the fuselage.

The rudder is pre-formed sheet balsa which is capped top and bottom with opposite grain balsa making a very rigid structure. Before the rudder hinge is assembled, the rear of the fuselage is cut open to insert the bellcrank for the full flying stabs. The stab bellcrank is different from the type normally seen. It has a short pivot point between the stab wires and is T-shaped. It's held in the fuselage by a setscrew which holds the main stab wire permanently in the vertical fin. The rudder is hinged with two fixed hinge points that have a tube passing through them, and through the three bearings that are attached to the rudder.

An unusual feature of the full flying stabs is that they only have one tube for the main stab wires. The very short front stab wire goes into a plastic rib attached to the root of each stab. This plastic root rib is tapped for a setscrew that firmly holds the stabs on. All that's needed to finish the stabs is to glue on the leading edge and flat-plate ply tips.

Both the canopy and dive brake linkage access hatch attach in the same way. The rigid, molded, pre-cut canopy is held in place with a small metal tongue in the front, and a swing latch in the back; a simple and very effective hold-down.

I almost forgot about the tow hook. It's a rather large nylon hook that I was initially a little hesitant to use as I intended to do zoom-style launches. The hook requires that a small slot be cut in the fuselage for an alignment tab, and also one hole for a single bolt. In spite of my initial hesitation, it's proven to be more than adequate. (Continued on page 115)



**"Matched Performance System"  
for TOP PERFORMANCE**

K&B ENGINES  
Airplane Marine

K&B FUELS 9 Blends K&B GLOW PLUGS 4 Choices

**"Matched Finish System"  
for BEST APPEARANCE**

K&B FIBERGLASS CLOTH K&B Micro-Balloons FILLER  
K&B SUPER POXY RESIN K&B SUPER POXY THINNER  
K&B SUPER POXY PRIMER K&B SUPER POXY PAINT  
K&B MIXING CUPS

 **K&B MANUFACTURING**  
12152 Woodruff Avenue  
Downey, California 90241

## KRESS JETS, INC.

4308 ULSTER LANDING ROAD  
SAUGERTIES, NY 12477  
914-336-8149

### DUCTED FANS

FAN	LIST	THRUST	DIAMETER
RK-720 MK II	\$ 84.50	3-4 LB	3-40 IN
RK-740 MK III	\$ 94.50	6-7 LB	4-13 IN
BOSS 602 PRO	\$119.50	10-12 LB	5-33 IN



FULL LINE OF  
LOW COST  
FANS, ENGINES  
& ACCESSORIES

Dealer Inquiries Invited

Write or Call for Illustrated Catalog \$2.00  
performance, specs, prices

## VINTAGE R-C PLANS



CONSOLIDATED  
PBY-5A "CATALINA"

9 FT. WING SPAN  
ALL RIBS & FULL FORMERS SHOWN ON PLANS !!  
PLASTIC ENG. COWLS \$10.90 PR.  
CLEAR GUN BLISTERS \$7.60 PR.  
4 LARGE PLAN SHEETS — Plans \$18.95  
6 FT. WING SPAN MODEL PBY-5A  
ENGINE COWLS \$7.50 PR. Plans \$14.95  
GUN BLISTERS \$5.50 PR. ADD \$3.00 POSTAGE

CATALOG-OVER 50 PLANS \$1.00 DEALERS WRITE

WORLD  WIDE

**SID MORGAN**

13157 ORMOND, BELLEVILLE, MICH. 48111 U.S.A.



## ADVERTISER INDEX MARCH 1988

Ace R/C	10
Advanced R/C Car Book	93
Airtronics	24-25
Alberta's Littlest Airport	21
American Boat Modeler Subscription	122
America's Hobby Center, Inc.	67
Associated Electrics	40
Astro Flight, Inc.	82
Badger Air-Brush	60
Balsa USA	91
Basics of R/C Boat Modeling	94
Basics of R/C Cars	111
Dave Brown Products	98
Bru Line	89
Byron Originals	32-33
Chevron Hobby Products	107
Clan Enterprises	52
Coverite	9
C&R Industrial Tool	10
Al Doyle	113
Du Bro Products	7
Duracraft	118
Fiberglass Master	76
Fox Manufacturing Co.	21
Franklin Mint	34-35
Futaba Corporation of America	C3
G.M. Plastics	72
G.M. Precision	58
Carl Goldberg Models	36, 59
Great Planes Model Dist.	43, 64
Historic Aviation	17
Hobby Hardware	107
Hobby Lobby International	80-81
Hobby Shack	77
Jackson Hobby Shop	89
JTEC	95
J&Z Products	76
K&B Manufacturing, Inc.	113
Kress Jets, Inc.	113
K&S Engineering	75
Loctite	88
M.A.N. Back Issues	96-97
M.A.N. Books	120-121
M.A.N. 400 Great Modeling Tips	26
M.A.N. Plans	116-117
M.A.N. Posters	119
M.A.N. Subscription	114
McDaniel R/C	52
MDM Corp.	21
Micro-Mark	28-29
Midwest Products Co., Inc.	3
Miniature Aircraft USA	61
Model Products Corp.	86
Model Rectifier Corp.	C2, 4, 53
Model Retailer	108
Sid Morgan Plans	113
Nostalg Air	112
O.S. Engines	C4
Bob Parkinson Flying Models	92
R.C.C.A. Subscription	11
Retailer Ad	95
Robart	110
Robbe Modelsport	99
Rocket City R/C Specialties	106
Royal Products Corp.	13
See Temps	112
Sheldon's Hobby Shop	99, 100-103
Sig Manufacturing Co.	83
Sky Hi	31
Southeast Model Products	112
Slim Line	90
Stitts Sparkplug	90
Sunshine Products	79
Tatone	78
T&D Products	112
Technopower	98
Telelite Company	106
Frank Tiano Enterprises	87
Top Flite Models	108
Tower Hobbies	109
Vailly Aviation	86
Video Specialties	86
Bob Violett Models	8, 75
Watkins Aviation	86
Williams Brothers	110
Zack-O	74
Zenith Aviation Books	19
Nick Ziroli	98

## SUPER RIETI

(Continued from page 113)

**FINISH:** The fuselage was sanded and given a little extra attention in the area of the mold seam. It was then given two coats of Pactra\* Prep Primer and sanded again. Since the fuselage is made of smooth, molded plastic, this was all I needed to do before the final painting. A couple of coats of K&B\* white epoxy produced a hard, high-gloss finish. All of the flying surfaces were finished in Top Flite\* white MonoKote. Since the Rieti has lines similar to some scale sailplanes, I trimmed the rudder and wing tips in red, as is common practice with full-scale planes. I installed a Cirrus 7 channel FM with four CS-238 servos and a 500mAh battery pack.

**PERFORMANCE:** The Super Rieti has a wingspan of 108.7 inches, and a wing area of 790 square inches. The recommended flying weight is 58 ounces, and my Rieti's final flying weight was 77 ounces. At its recommended flying weight, the Rieti would have a wing loading of 10.4 ounces to the square foot. At 77 ounces, the wing loading was a rather hefty 14 ounces to the square foot. However, even at this wing loading, the Rieti performs well with its fully sheeted wing and relatively clean lines.

The initial test flight was not the classic review flight: "It flew right off the board and didn't need any trim adjustments." The model was balanced according to the plans at about 45 per cent of the root chord. Even though the wing leading edge is swept, I felt that the CG was too far back. However, since I wanted to follow the instructions for the review, I gave it a shot. I wish I'd gone with my gut feelings! On the first launch, as the Rieti came off the line it immediately stalled, and it took full down-trim, plus 1/4 down-stick, to fly level. A couple of flights later, with 6 more ounces of lead in the nose (I originally started with 5 ounces), the model was flying beautifully.

I have a fairly strong 12V winch, and the Rieti handles it well with a strong zoom at the end. The tow hook could be moved back quite a way for a steeper launch. As would be expected with a model having a fairly high wing loading and sporting an Eppler 205 airfoil transitioning to a Ritz 13010, the Rieti really moves out. It covers a lot of ground allowing you to search out thermals farther afield than most poly ships, and still allows you to get back to the landing circle. Since the ailerons and rudder are electronically coupled (a feature of the Cirrus transmitter), the Rieti is smooth



**FOR THE R/C  
CAR  
ENTHUSIAST  
ON NEWSSTANDS AND  
IN HOBBY  
SHOPS EVERYWHERE**

and responsive. With very little elevator input it holds a thermal turn and it climbs out rapidly when encountering lift. The dive brakes are extremely effective and should only be used with care and moderation. They're designed to raise almost 90 degrees to the upper surface of the wing. However, when they're fully extended it's possible that they may slightly blank out the tabs. It only takes about 1/3 deflection to get a rapid rate of descent.

**CONCLUSION:** The Super Rieti is a very high-performance glider suitable for the more experienced flier. It's a high-quality kit offering some new concepts in construction, and some very innovative linkages and hardware. Imported by United Model Products, it sells for about \$150. For the modeler looking for a European-style ship it's well worth the money, and at a price that's considerably lower than that of most imports.

\*The following are the addresses of the companies mentioned in this article:

United Model Products, 301 Holbrook Dr., Wheeling, IL 60090.

Pactra (Plasti-Kote), 410 N. Michigan Ave., Rm. 1280, Chicago, IL 60611.

K&B Manufacturing, 12152 Woodruff Ave., Downey, CA 90241.

Top Flite Models, 2635 S. Washash Ave., Chicago, IL 60616. ■



# Classified

**RAZOR BLADES:** Single-edge industrial quality, super sharp. 100/\$4.75, 200/\$9.50, 300/\$14.25, 500/\$23.50, 1,000/\$46.00; add 10% postage west of the Mississippi. Cobble's Gifts, Box 2, Deal, NJ 07723; 201-922-9898.

**WANTED:** RTF U-Control planes from Cox, Wen-Mac, Comet, Aurora, Testors, etc., complete or pieces, buy or trade. John Fietze, P.O. Box 593, Lynbrook, NY 11563.

**ANTIQUATE MODEL IGNITION ENGINES—PARTS CATALOG,** 50 pages, precision cast timers, original cylinder heads, point sets, drive washers, tanks, for GHQ, O&R, O.K., many others. Large catalog \$4.00 pp. Chris Rossbach, RD 1, Queensboro Manor, Gloversville, NY 12078.

**HARDWARE AND SOCKET HEAD** cap screws, all sizes, low prices. Write for complete list. Example 6-32x1" only \$4.25 per hundred. Micro Fasteners, P.O. Box 42A, Netcong, NJ 07857.

**WANTED:** Model airplane engines and model race cars made before 1950. Jim Clem, 1201 E. 10, P.O. Box 524, Sand Springs, OK 74063; 918-245-3649.

**ENGINE COLLECTORS:** Spark ignition and old diesels for sale. Riccardo Taccani, CP59, 6834 Morbio INF Switzerland.

**WANTED:** Model engines made before 1950. Don Blackburn, P.O. Box 15143, Amarillo, TX 79105; 806-622-1657.

**WANTED: GERMAN DIESEL,** (e.g., Taifun, Webra, Jaguar) or early glow engines (e.g., Webra Big Ben 5cc, Webra Sport Glo A956), only new or NIB. Also German free flight and early R/C-kits. Will pay fair prices. Dr. W. Sturn, JM Strasser Feld 29, D-512 Herzogenrath, W. Germany; 2406-5952.

**FOR SALE:** Model Airplane News, Flying Aces, 1934-1960, others, \$1 for list. Bruce Thompson, 328 St. Germain Ave., Toronto, Ontario, Canada M5M 1W3.

**SCALE DOCUMENTATION: PLAN ENLARGING.** Photo packs, 3-views, drawings for 1,600 aircraft. Super-scale R/C plans for Giant, Sport; 43-page catalog \$3. Scale Plans and Photo Service, 3209 Madison Ave., Greensboro, NC 27403; 919-292-5239.

**IMPORTED DIESEL ENGINES:** Aurora, K-Mills, M.V.V.S., P.A.W., Pfeffer, Silver Swallow and Replica Taplin Twins. SILVER SWALLOW .15 c.i. Diesel \$35.00 Postpaid. Also Llam, M.V.V.S., P.A.W., and Silver Swallow Glow engines, \$1.00 Catalog. CARLSON ENGINE IMPORTS, 814 East Marconi, Phoenix, AZ 85022.

**WANTED: EARLY PROPORTIONAL R/C SYSTEMS** (1961-1967): Sampey 404, Space Control, Dee Bee Quadruplex CL5, Orbit Analog, Digicon, Kraft-Pullen, Logictrol, Micro-Avionics. Working condition preferred. Mike Shabot, 27286 Eastvale Road, Palos Verdes Peninsula, CA 90274. (213) 541-7229.

**WANTED:** Berkeley and Cleveland kits or related items: parts, plans, boxes, brochures, books, ads, radio equipment, accessories, etc., Gordon Blume, 4649-191st Ave. S.E., Issaquah, WA 98027.

**ELECTRIC FLIGHT SYSTEMS:** Largest electric flight supply in the North East, specializing in Astro Flight Systems. \$2.00 for illustrated catalog or \$1.00 for price list. C S Flight Systems, 31 Perry St., Middleboro, MA 02346.

**JET ENGINES:** Turbines, pulsejets, and ramjets. Monthly newsletter \$12/yr., sample \$1.00. Cosmojet \$292.50. Dynajet \$195.00. Surplus G8-2-20 \$489.00. Catalog \$5.00. Doylejet, 4015 San Jacinto #404A, Houston, TX 77004.

**ENGINES: IGNITION GLOW.** Collectors, runners, used, new. Sell, trade, buy, SASE for list. Rob Eirman, 504 Las Posas, Ridgecrest, CA 93555; (619) 375-5537.

**"LEARNING TO FLY R/C** With or Without An Instructor," \$2.95 plus .56c postage. Jim Waterman, 3818 Deerfield Dr., San Antonio, TX 78218.

**PLANS CONTROLINE SCALE C130 Hercules** for .049's 46-inch wingspan \$7.95. JVS Plans, 5017 N.W. 61 St., Oklahoma City, OK 73122.

**BUILDING BOARDS.** Flat, warp-resistant, 3/8-inch pinnable surface, 16 inches wide, 48 inches long. Free brochure. Limestone Enterprises, Box 586-MA, Athens, Alabama 35611.

**FREE AVIATION RESEARCHER'S BOOK CATALOG.** Fully indexed. 1001 entries. Send for your copy today. Greiner Associates, 16-2N Mistuxet Ave., Mystic, CT 06355.

**BUILD AND MAINTAIN YOUR OWN ELECTRONICS.** Battery charger, constant current charger, digital ESV, etc. Radio Shack parts. Very complete instructions for the non-electronics person. Satisfaction guaranteed. Business size SASE for information. Lico Electronics, 700 NW 7th Ave., Boca Raton, FL 33486.

**AIRCRAFT RESEARCH:** Need rare aircraft documentation, photos, three-views? Send requests with \$1.50 U.S. for sample information. Mr. I.A. Ross, 1447 Helm Crt., Mississauga, Ontario, Canada L5J 3G3.

**SALE: THE FAMOUS CYCLONE** 1/4-scale 2.4 engine. One year warranty. Complete with mount, hub, muffler for \$89.95. Twin 3.7, \$399.95 complete. Visa, MC + 5% SASE business envelope. For catalog of engines: 14925 S. Kilbourne Ave., Midlothian, IL 60445.

**WANTED: FOX 1.2 TWIN.** Prefer new or in excellent condition. May consider used also. Please write: Ron Desrochers, 270 Hawk Rd., Fairbanks, AK 99712; (907) 457-3102.

**NO. 11 CRAFT/HOBBY BLADES.** Super sharp carbon steel, made in USA, 100 pack \$8.95, 10/100 packs \$69.50 delivered. Berkeley Trading Co., Dept. AA, P.O. Box 26, Berkeley Springs, WV 25411. Visa/MC welcome.

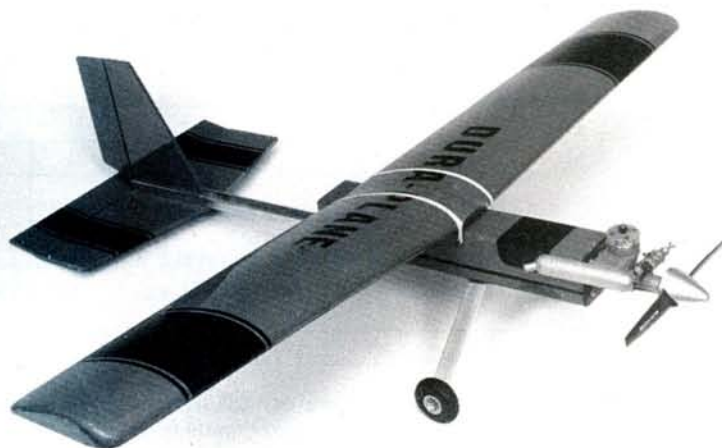
**ENGINES: IGNITION, GLOW.** Collectors, runners, used, new. Sell, trade, buy, SASE for list. Rob Eirman, 504 Las Posas, Ridgecrest, CA 93555; 619-375-5537.

**SEMI-KITS FABRICATED** from your plans. Parts cut from balsa, bass, pine, maple and plywood. Custom wood sizes and shapes cut from your specs. Send SASE for quotes. Model Wood Specialties, 4209 24th St., Kenosha, WI 53142.

**PLANS ENLARGED, 3-VIEWS, DRAWINGS.** Economical, precise. Free information. Concept, P.O. Box 669E, Poway, CA 92064; (619) 486-2464.

**WANTED: COX CURTISS PUSHER** plastic u-control kit in box with pilot, about 1962. Charles W. Pyeatt, 2822 Palos Verdes Dr. W., Palos Verdes Estates, CA 90274.

Send ad and payment to *Model Airplane News*, 632 Danbury Rd., Wilton, CT 06897. **Non-Commercial classified ads** (commercial ads of any kind not accepted at this special rate). Rate: 15 words or less, \$4.50 payable in advance. No charge for name and address. Additional words, 25¢ each. **Commercial classified ads** (rate applies to anyone selling on a commercial basis—retailers, manufacturers, etc.). Rate: 50¢ per word, payable in advance. Count all initials, numbers, name, address, city and state, zip and phone number. **Closing Date** for either type of ad is the 20th of the third preceding month (for example, January 20th for the April issue). We do not furnish box numbers. If you would like your ad to run in more than one issue, multiply amount of payment by number of months that ad is to run. It is not our policy to send sample copies or tear sheets.



## THE DURA•PLANE TRAINER

### A Big Hit at the Toledo Show

- The most durable airplane kit ever designed
- made of PVC plastic, aluminum, foam and balsa
- the ideal model for the first time builder and flyer
  - 45 in. foam wing
- requires a 2-3 channel radio
- quick to build and easy to fly

**DURACRAFT**

1007 Orchard Grove Dr.  
Royal Oak, MI 48067